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A  
DISCOURSE  
OF THE  
ROMANE FOOT,  
AND  
DENARIVS:

From whence, as from two principles;  
THE MEASURES,  
AND  
WEIGHTS,  
used by the Ancients, may be deduced.

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By JOHN GREAVES, *Professor of Astronomy  
in the Vniversity of Oxford.*

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Σπουδαστον ὅπως δειδῶσι ἡλῶς αἱ ἀρχαί. μὲν ἂν γὰρ  
ἔχουσι ῥοπλὴ πρὸς ἐπιβήματα.

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L O N D O N,  
Printed by M. F. for William Lee, and are to be  
sold at his shop at the sign of the Turks head  
in Fleet-street. 1647.

*Vna fides, pondus, mensura, moneta sit una,  
Et status illeſus totius Orbis erit.*

**Budelius de monetis.**

Bayerische  
Staatsbibliothek  
München.

To his truly noble, & learned friend,  
*John Selden* Esquire, Burgesse of the  
 University of *Oxford* in the Honoura-  
 ble House of Commons.

SIR,



*That I should present You, who have  
 so honourably deserved of Anti-  
 quity, and of Your Country, and, if  
 I may add mine own obligations, in  
 particular of me, with so small a  
 retribution, as a Romane foot, &*

*Denarius, may seem more proportionable to mine a-  
 bilities, then to the eminency of Your place, and  
 worth. But You who, to the honour of Your profes-  
 sion, have joined the wisdom of the Ancients, and  
 justly have merited this elogy,*

—Anglorum gloria gentis  
*Seldenus,*

*An elogy long since given You by a man, who is  
 deservedly esteemed πολλῶν ἀντάξιός ἄλλων, the lear-  
 ned Hugo Grotius, You are best able to judge of  
 what importance these two are, in the discovery of  
 the weights, and measures, used by the Ancients.*

*And first, for measures, the πῶς, or cubit of  
 the Sanctuary, in the Scriptures, Josephus, and the  
 Rabbines: the Αἰγυπτίῳ and βαβυλωνίῳ πῆχυς in  
 Herodotus (the former equall to that of Samos:  
 the later mis-rendred by Pliny, & Solinus, Pes Ba-  
 bylonius): The περσάτης Περσικὸς in Herodotus,  
 containing XXX. στάδια, in Strabo, sometimes LX.*

A 2

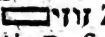
sum:-

sometimes XL. and sometimes XXX. (but in Hesychius ὁ παρεσσίγης ἔχει μίλια τέτταρα, and in Abulfeda three miles: with whom, and with

فرسخ the Persians to this day it is called the  
 الفرساخ farfach): the χοῖν & Αἰγυπτιοῖς in Herodotus, Artemidorus, and Strabo: the πῆς βαβυλωνίος, καὶ φιλεπαιρείας in Hero: the pes Ptolemaicus, and Drusianus, in Hyginus: besides infinite others depending upon the proportions of some of these: I say, these cannot after the destruction of those ancient Monarchies, and Republicks, any other way be restored, then from such monuments, as, by divine providence, have escaped the hands of ruine, and continued to these later ages. For Were it not that the pes Romanus, or Monctalis, as Hyginus terms it, were still extant in Rome, on the monuments of Cosutius, and of Tit. Statilius Vol. Aper (for those two columnes, the one With the inscription ΠΟΔ. Θ. mentioned by Marlianus, and Philander: the other with ΠΟΔ. ΙΒ. seen by the same Philander, are both lost) we might utterly despair of knowing the measures of the Hebrews, Babylonians, Persians, Egyptians, Grecians, Romanes, and of all others, described in Classicall Authors: who could not transmit to posterity the individuall measures themselves, but onely the proportions they respectively had to one another: which proportions being pure habitudes, cannot, as Mathematicians observe, be reduced to the measures of these times, unlesse, either some of the ἀρχαῖα themselves were existent: or else exact copies taken from the Originals were derived to us.

In like manner it is for weights, the סבה, the  
 בכר,

The farfach,  
 with the Ancients, and Moderns, contains three miles.  
 Abulf. Geogr.  
 MS.

ככר, the שקל, or סלג of the Hebrews, or מלכ of the Chaldeans, which Aruck renders by four  Zuzim, that is, four denarii (from whence, the Persian סלג in Xenophon, and Hesychius, may have received its denomination) : the τάλαντον Βαβυλώνιον, containing seven thousand Attick drachmes, the τάλαντον Αιγναϊον ten thousand, the τάλαντον Σύρον a thousand five hundred, the τάλαντον Ἀττικόν six thousand, all mentioned by Julius Pollux ; the Talentum Ægyptium in Varro, containing eighty pondo, or pounds ; the talentū Euboicum in Festus, four thousand denarii : these, with infinite others, both mensuræ, and pondera, whither considered as Medica, or Georgica, or Veterinaria, cannot in our times be restored, but onely by such weights of the Antients as are still extant ; that is, either by the denarius of the Romanes, or δραχμή of the Grecians, or by the congius of Vespasian, or by the libræ, and uncia Romanæ, and the like, that have been preserved by Antiquaries.

Seeing therefore the denarius is of as great moment for the discovery of weights, as the Romane foot for the knowledge of measures, I have taken these two, as two irrefragable principles, from whence the rest used by the Ancients may be deduced. And because the denarius may be considered in a double respect, either as nummus, or as pondus : the first acception conducing to the valuation of coins, the second to the certainty of weights : it was therefore necessary that both the weight, and valuation of the denarius, should be exactly known. To which purpose, in Italy I examined with a balance (the scale of which the eightieth part of a grain would sensibly turn) many hundred fair denarii,

both

both Consulares, and Cæsarei, as also quinarîi, or victoriati in silver: severall aurei of the former, and later Emperours: besides the originall standard of the congius, placed by Vespasian in the Capitol: and many uncia, and libra, in brasse. From whence I collected the weight of the denarius Consularis, and Cæsareus: that to be the seventh part of the Roman ounce, as Celsus, Scribonius Largus, and Pliny rightly describe: and this to be sometimes the eighth part, and sometimes the seventh, but most frequently in a middle proportion betwixt eight, and seven, till Severus, and Gordianus' times: under whom, and the succeeding Emperours, it recovered the weight of the denarius Consularis; but lost much of its fineness, by the mixture of allay.

With these denarii, for the greater certainty, I compared such Grecian coins (especially Athenian) as I had either seen in choice cabinets, or bought of mine own; and those were the χρυσί, or sámpes absolutely taken, which, as Julius Pollux, and Hesychius, out of Polemarchus testifie, weighed two drachmes: the τετράδραχμα, or ~~τρία~~δραχμα, or sámpes ἀρρετίς, four drachmes: the δισδραχμαί, the τριώβολα, or as Pollux names them, the ημίδραχμα, with severall others.

By which comparison I first discovered, that howsoever the Romanes, as Pliny, and A. Gellius expressly; Valerius, and Suetonius, by way of consequence, equall the denarius to the drachma: and though the Greeks, as Strabo, Cleopatra, Plutarch, Galen, Dio, and many more, equall the drachma to the denarius, speaking in a popular estimation, and as they vulgarly passed in way of commerce; yet if we shall put on the resolution of him in the Comedy,

Ocul-



Oculatæ non — aut manus, credunt quod vi-  
dent:

we may evidently discern in the scale, the drachma Attica to be heavier then the denarius. And therefore all such writers of the Ancients, as equall them, if we speak strictly of weight, and not of estimation, have been deceived: and consequently, all modern writers, following their traditions, in discourses de ponderibus, & de re nummaria, have erred.

But because it is not probable, that the Ancients, both Greeks, and Romanes, should be deceived in their own coins, and in their own times: it occasioned me by observing the practise abroad of the ~~various~~ said in exchanges, with whom the same specificall coins, in different States, passe with different estimations, to think of some means how I might reconcile the traditions of the Greeks, and Romanes, concerning the weight, and valuation of the drachma Attica, and denarius; notwithstanding the difference in the balance, of such as are now found at Athens, and at Rome.

And this drew from me that discourse, which I have inserted at the end of this booke, Of some directions to be observed in comparing the valuations of coins: which may serve, not onely to reconcile the Greek, and Romane writers, but especially, the traditions of Philo, Josephus, Epiphanius, Saint Hierome, and Hesychius: who make the Hebrew שֶׁקֶל shekel, equall to the Attick tetradrachme: whereas in the scale, which is the best judge of this controversie, I finde them manifestly unequall: the Hebrew, or Samaritane shekel, being much lesse then the Attick tetradrachme.

But it may be questioned, why I have not written the labours of Portius, Budæus, Alciatus, Agricola, Mariana, Budelius, Alcafar, Villalpandus, Jo. Scaliger, Capellus, Snellius; and of many other eminent men, who have writ, either *deditâ operâ*, or *ἐν μέσῳ*, de ponderibus, & mensuris, I should undertake any thing of this nature. My answer is, that observing in them so great a variety, and contradiction of opinions, I was willing to use mine own judgement, how mean soever; in giving my self private satisfaction. And though I intended this work, as a *παρρηγοῖον* to other employments; yet having, by the advantage of travailling in forain parts, perused in Italy, Greece, and Egypt, more Antiquities, then I think any of them above named single, I thought it would not be unacceptable, if I did, as it is the manner of Travellers, publish at home, such observations, and discoveries, as I made abroad. The which I humbly dedicate to You, as out of a desire to expresse my gratitude for many noble favours: so out of an assurance, that if they receive Your approbation, I need not to fear the censure of others.

Your most obliged friend,

and humble servant,

John Greaves.

# OF THE ROMANE FOOT.



That the foot was the most received, and usuall measure amongst the Romans, as the cubit amongst the *Jews*, is a thing not controverted by any. For<sup>a</sup> *Polybius* de-

<sup>a</sup> *Polyb. li. 6.*

scribing their *Scutū*, makes it in breadth over the bend two [Romane] feet and an half, and in length four feet: or, if it be of a greater sort, a palme more is to be added to this measure. And not

long after expressing the manner of their castrametation, or encamping, he<sup>\*</sup> writes; that as often as a place is designed for the camp, the *Prætorium* (or Generals lodging) takes up that part, which is fittest for prospect, and direction. Setting therefore up the Standard, where they intend to fix the *Prætorium*, they so measure out a square about the Standard, that each side may be distant from it an hundred feet, and the whole area contain foure iugera. In like manner<sup>b</sup> *Cæsar*, in the description of his bridge over the *Rhine*, makes the binders, or transversary beames, to be *bipedales*.

<sup>c</sup> *Tully* also judges the quantity of the apparent diameter of the Sun to be *pedalis*. And not to produce more Authorities, <sup>d</sup> *Suetonius* relates, that *Augustus* presented before the people of Rome

<sup>\*</sup> *Polyb. ibid.*  
τεθείσης δὲ τῆς  
σημαίας, ἔ-  
μέλλουσιν πη-  
γυῖαι τὰν τῶν  
δομετρῶν  
πείξαι τῆς σημαίας  
τετραγώνου  
τόπου, ὡς τε  
πάσης τῆς  
πλευρᾶς ἕνα  
τον ἀπείχων  
πόδας τῆς ση-  
μαίας, &c.

<sup>b</sup> *Cæf. Comm.*  
lib. 4.

<sup>c</sup> *Cicero l. 2.*

*Academ. quæst.*

<sup>d</sup> *Suetonius in*  
*Augusto.*

B

Lucius

*Adolescentulū  
Lucium honestē  
natum exhibuit,  
tantum ut o-  
stenderet, quod  
erat bipedali  
minor, librarum  
xvii. ac vocis  
immensæ.*

Lucius a young Gentleman, well descended, onely for to shew that he was lesse then two feet in height, seventeen pounds in weight, and of an immense voice. But concerning the precise quantity of this foot, there is not any one thing after which learned men have more inquired, or in which they doe lesse agree. For *Budens* equals it to the *Paris* foot; *Latinus Latinus*, *Maffæus*, *Vrsinus*, and others, deduce it from an ancient monument in the Vatican of *T. Statilius Vol. Aper: Portius Vicentinus*, *Philander*, *Georgius Agricola*, *Ghetaldus*, *Donatus*, and severall others, contend the foot on *Cossutius* monument in *Rome*, to be the true Romane foot: *Marlianus* describes it out of a *Porphyry* columnne, with this inscription ΠΟΔ. Θ: *Lucas Patus* defines it from some brasse feet found amongst the *rudera* in *Rome*: *Villalpandus* derives it from the measure of the *Congius*, placed by *Vespasian* in the *Capitol* (the originall Standard being still extant): *Willebrordus Snellius* equals it to the *pes Rhinlandicus*: and severall others have had severall fancies, and conjectures. In such a variety, and uncertainty of opinions, we have no more solid foundation of our inquiry, then either to have recourse to the writings of the Ancients; or else to such other monuments of Antiquity, as having escaped the injury, and calamity of time, have continued intire to this present age.

• *Vitruvius* l. 3.

And first for the Ancients. • *Vitruvius* in his third book of Architecture, gives this description of the Romane foot: *E cubito cū dempti sunt palmi duo, relinquitur pes quatuor palmorum. Palmus autem habet quatuor digitos, ita efficitur*

nti

*uti pes habeat XVI. digitos, & totidem asses areos denarius.* <sup>f</sup> *Columella* shews that it was the basis, <sup>f</sup> *Columella l. 9. de R. Rust.* and foundation to all their other measures: *Modus omnis area pedali mensurâ comprehenditur, qui digitorum est XVI. Pes multiplicatus in passus, & actus, & climata, & jugera, & stadia, centuriasque, mox etiam in majora spatia procedit.* *Passus pedes habet V.* <sup>s</sup> *Frontinus* more clearly, <sup>s</sup> *Frontinus de lib. militibus agrorum.* and distinctly expresseth the severall parts, and divisions of it. *Pes habet palmos IV. uncias XII. digitos XVI.* *Palmus habet digitos IV. uncias III.* *Sextans, quæ eadem dodrans appellatur, habet palmos III. uncias IX. digitos XII.* From which Authority of *Frontinus*, and the place before cited of *Vitruvius*, we may collect some analogy to have been observed in the proportions of the Romane foot, and of the Romane coins. For as the *denarius* contained *XVI. asses*, so the foot contained *XVI. digitos*: And as the *assis* was divided in *XII. uncias*, so likewise the foot was divided in *XII. uncias*; and therefore the *dodrans* is used by *Frontinus*, and the *semina*, and *scilicus* by *Pliny*, for proportionable parts of the Romane foot; as the same are used by other Classicall Authors for proportionable parts of the Romane *assis*, and *uncia*. From which analogy, the *pes Romanus*, I suppose is rearm'd by \* *Hyginus pes monetælis*. Likewise in \* *Hygin. de lib. mil. constit.* the ancient Laws of the *XII. Tables* ( which *Tully* calls the fountains of the Civill Law ) the *sestertius pes* hath the same proportion with the *sestertius in coines*; For as the *sestertius* according to *Arruntius*, was olim *dupondius* & *semissis*, <sup>\*</sup> *Arruntius editione Grotii.* anciētly two pounds of brasse and an half;

\* Vol. Mat: de  
affis distrib.

<sup>h</sup> Agricola de  
mensuris qui-  
bus intervalla  
metimur.

\* Frontinus de  
limitibus agro-  
rum.

<sup>i</sup> Frontinus de  
aqueductibus.

so the *sestertius pes* was two feet and an halfe.  
 \* Volusius Matianus, « *Sestertius duos asses &*  
 « *semissem, quasi semis tertius*; Græca figura  
 « ἑξάδρακμον ἡμιτάλαντον. Nam sex talenta & se-  
 « mitalentum eo verbo significantur. Lex eti-  
 « am XII. Tabularum argumento est, in qua duo  
 « pedes & semis, sestertius pes vocatur. But  
 to return to Frontinus, who farther discour-  
 sing of the Romane foot, gives a distinction  
 of three sorts of feet: and those were  
 first, *pes porrectus*, next, *pes constratus*, or as <sup>h</sup> A-  
 gricola reades it, *contractus*, and lastly, *pes*  
*quadratus*. The first was the measure of longi-  
 tudes; the other two of superficies. There  
 were, writes \* Frontinus, In pede porrecto semi-  
 pedes duo, in pede constrato semipedes quatuor;  
 in pede quadrato semipedes octo. Which words  
 of his are to be thus explicated; the *pes por-*  
*rectus*, was the Romane foot extended in  
 length, and therefore there were in it semi-  
 pedes duo: The *pes constratus*, was the square of  
 the *semipes*, and therefore the perimeter of it  
 contained *semipedes quatuor*, or, which is all  
 one, two intire Romane feet: The *pes quadra-*  
*tus*, was the square of the Romane foot; where-  
 fore of necessity there must bee foure feet  
 in the perimeter, or in Frontinus' expression,  
 eight *semipedes*. The same <sup>i</sup> Author likewise in  
 his book *de aqueductibus*, describing the digit, &  
*uncia* of this, (*Est autem digitus*, (saies he) *ut*  
*convenit, sexta decima pars pedis, uncia duo-*  
*decima*) useth a distinction of digits, as hee did  
 of feet before, not mentioned by any other Au-  
 thor: *Quemadmodum autem inter unciam, & di-*  
 gitum

gitum diverſitas, ita & ipſius digiti ſimplex obſervatio non eſt. nam alius vocatur quadratus, alius rotundus. Quadratus tribus quartis decimis ſuis rotundo maior: rotundus tribus undecimis ſuis quadrato minor eſt. The proportions here aſſigned by him to the *digitus quadratus*, and *rotundus*, are the ſame, which <sup>1</sup> *Archimedes* long <sup>1</sup> *Archim. de circ: dimenſ. prop. 2.* before uſed: and thoſe are, that a circle hath the ſame proportion to the ſquare of the diameter, that *XI.* hath to *XIV.* *Hero* alſo, diſcourſing of ſeverall ſorts of meaſures, informes us thus concerning the foot: 'Ο μὲν δακτύλος, μέτρον ὅτι ſμικρότατον. ἡ δὲ δοχμὴ ὅτι δακτύλων δ', ὅπερ μέτρον καὶ δακτυλοδοχμὴ παλαιή τε καὶ δῶρον καλεῖται. ἡ δὲ λιχὰς ὅτι δακτύλων ι', τὸ δ' ὀρθόδωρον ια', ἡ δὲ πωιδάμη ιβ', ὁ δὲ πῦς δόχμων δ', ἥτοι δακτύλων ις', ἡ δὲ πυγμαὶ δακτύλων ιθ', ὁ δὲ πυγὼν κ', ὁ δὲ πῆχυς κδ', ἥτοι δοχμῶν ε', ἡ δὲ ὀργυιὰ πῆχεων δ', ἥτοι ποδῶν ε', the digit is the leaſt meaſure, the palm conſiſts of *IV.* digits, and is called *dactylodochme*, and *palaiſte*, and *doron*. The *lichas* is *tenne* digits, the *orthodoron* *eleven*: The ſpan *XII.* The foot hath *IV.* palmes, or *XVI.* digits the *pygme* *XVIII.* digits. The *pygon* *XX.* The cubit *XXIV.* or *VI.* palms the *orgyia* *IV.* cubits, or *VI.* feet. Moſt of which meaſures the *Romane* borrowed from the *Greeks*; as on the contrary the *Greeks* borrowed the *ἰσχυρον*, and *μίλιον*, from the *Romane* *jugerum*, and *milliare*. The ſame *Hero* deſcribes another ſort of foot uſed in *Italy*. 'Ο δὲ *Ιταλικὸς* ποῦς δακτύλους ἔχει τρεῖς καὶ δέκα καὶ τρίτον. The *Italian* foot contains *thirteen* digits, and *one third*. Whence <sup>m</sup> *Salmaſius* concludes, that the *Romane* uſed <sup>m</sup> *Salmaſii Exercit. Plinianæ.*

one sort of foot in *Rome*, consisting of *XVI.* digits, and in some parts of *Italy* another being but *XIII.* digits, and one third. Which might

<sup>a</sup> *Hyginus de limitibus constit;*

be granted, did not <sup>n</sup> *Hyginus*, who is much ancier, in his tract *de limitibus constituendis*, contradict it. His words are these: *Item dicitur in Germaniâ in Tungris pes Drusianus, qui habet monetalem, & fescunciam, ita ut ubicunque extra fines, legesque Romanorum, id est, ut sollicitius proferam, ubicunque extra Italiam aliquid agitur inquirendum; & de hac ipsâ conditione diligenter pramoneo, ne quid sit, quod praterisse videamur.* Where speaking

immediately before of the *pes Romanus*, or as he also calls it, the *pes monetalis*, by which he measures and defines the *limites*, he gives us this caution, that out of *Italy* (for in *Italy* he supposes one measure to be generally received) we are to observe the quantity of the foot, or measure of the Country. And for this reason, to avoid ambiguity, he assigns the proportions of the *pes Drusianus*, at *Tongerem* in *Germany*, to be a *fescuncia* more then the *pes monetalis* used at *Rome*, and in *Italy*. And so in another part about *Cyrene*, which *Ptolemy* gave to the *Romanes*. <sup>o</sup> *Pes eorum qui Ptolemaicus appellatur habet monetalem pedem, & semunciam.* But to omit the *pes Ptolemaicus* (For our inquiry is onely of the *Romane foot*.) I cannot but wonder

<sup>i</sup> *Hyginus ibid.*

<sup>\*</sup> *Ios: Scaliger de re nummariâ*

at the mistake of <sup>\*</sup> *Ioseph Scaliger*, concerning the *pes Drusianus*, and *Romanus*, who thus writes. *Pes igitur ille Drusianus major est Romano fescunciâ, fuit enim XXII. digitorum, quantum XVI. est pes Romanus.* If it were but a *fescun-*



*sesuncia*, greater then the Romane foot, as *Hyginus*, and he also make it, how can it possibly be *XXII. digitorum*? or how can he excuse his words, which immediately follow? *Ex quo colligimus pedem Drusianum omnino esse eum, qui hodie in Galliâ, & Belgio in usu est, qui profectò major est VI. digitis, quantorum XVI. est pes, qui Roma in hortis Angeli Colotii sculptus in saxo visitur. Eum enim nos cum pede Gallicano comparantes, id verissimum esse deprehendimus.* Neither is the errour of some others much lesse, in making the *pes monetalis*, or *Romanus*, and *pes Regius Philetarius*, to be equall. Because the Romane foot consisted of *XVI.* digits, as *Frontinus* writes, and the *pes Philetarius* of as many, as *P Hero* shews: *ὁ ποῦς ὁ μὲ βασιλικὸς, καὶ φιλεταίριος* *P Hero in Isa*  
*ὁ λεγόμενος ἔχει παλαιὰς δ', δακτύλους ις'*, there- *fore*  
fore both these are equall. The errour is in supposing all digits to be alike; and therefore the same number of digits being in both, that both are equall. By the same argument we may conclude the Romane foot, and Arabian foot, and the *derah*, or cubit of these, to be equall to the cubit, or *sesquipes* of the Romanes: seeing *Abulfeda*, an Arabian Geographer, defines the *derah* to consist of *XXIV.* digits, and so many also did the Romane *sesquipes* contain. But the observation of *Rhemnius Fannius* in this particular is much better; which he applies to weights, *Rhemnii Fannii fragmentū.*  
and we may by analogy assign to measures.

*Semina sex alii filiquis latitantia curvis*

*Attribuunt scripulo, lentes veraciter octo,*

*Aut totidem speltas, numerant, tristisve lupinos*

*Bis duo; sed si par generatim his pondus inesset,*

*Servarent eadem diversa pondera gentes :*

*Nunc variant. Etenim cuncta non fœdere certo  
Natura, sed lege valent, hominûmque repertis.*

<sup>1</sup>Isid. Hispat.  
l. 15. c. 15.

But to return to the Romane foot. Lastly, we may alleage <sup>1</sup>Isidorus Hispalensis. *Palmas autem, quatuor habet digitos, pes XVI. digitos, Passus pedes quinque, Pertica passus duos, id est decem pedes.* And this is that which I finde delivered by such of the Ancients, as are extant. Out of which bare, and naked descriptions, it is as impossible to recover the Romane foot, as it is for Mathematicians, to take either the distance, or altitude of places, by the proportions of triangles alone, or by Tables of Sines, and Tangents, without having some certain and positive measure given, which must be the foundation of their inquiry. All that can be collected by these descriptions, is this, that wee may know into how many parts the Romanes usually divided their feet; and all these divisions I have seen in some ancient ones. But suppose there were no Romane foot extant; how by XVI. digits, or by IV. palms, or by XII. *uncias*, (which is the most uncertain of all; seeing whatsoever hath quantity, how great or small soever it is, may be divided in XII. *uncias*) could it be precisely restored? For if that of \* *Protagoras* be true, as well in measures, as in intellectuall notions, that man is *πάντων χρημάτων μέτρον*: Whence <sup>2</sup>*Vitruvius* observes, that the Latines denominated most of their measures, as *their digit, palm, foot, and cubit*, from the parts and members of a man: who shall bee that perfect and square man, from whom we may take a pattern of these measures?

\* *Protagoras apud Aristot. l. 13. cap. 5. Metaphys. πᾶσι τῶν ἔσθαι χρημάτων μέτρον ἔστιν ἀνθρώπων.*

<sup>2</sup>*Nec minus mensurarum rationes, quæ in omnibus videtur necessariae esse, ex corporis membris colligerunt: uti digitum, palmum, pedem, cubitum.* *Vitruv. l. 3. c. 1.*

or

or if there be any such, how shall we know him? or how shall we be certain the Ancients ever made choice of any such? Unlesse, as some fancy, that the cubit of the Sanctuary, was taken from the cubit of *Adam*, he being created in an excellent state of perfection: So we shall imagine these digits, and palms, to have been taken from some particular man of completer lineaments then others. On the other side, if this foot may be restored by the digits, and palms of any man at pleasure, since there is such a difference in the proportions of men, that it is as difficult to finde two of the same dimensions, as two that have the same likenesse of faces, how will it be possible, out of such a diversity, to produce a certain and positive measure, consisting in an indivisibility, not as a point doth in respect of parts, but in an indivisibility of application, as all originals, and standards should doe. The *Arabians*, to avoid this difficulty, shew us a more certain way, as they suppose, how to make this commensurall digit, and consequently the foot: and that is by the breadth of six barley corns laid one contiguous to another. For thus \* *Muhammed Ibn Mesoud* in his book, intituled in Persian *gehandanish*, relates; that in the time of *Almamoon* (the learned Calife of *Babylon*) by the elevation of the pole of the aquator, they measured the quantity of a degree upon the globe of the earth, and found it to be fifty six miles, and two thirds of a mile: every mile containing four thousand cubits, and each cubit twenty four digits, and every digit six barley corns. The same proportions are assigned in the *Geographia*

مسعود  
ابن  
موسى  
م.س.

*phia Nubiensis*, printed in Arabick at Rome =

الذراع اربعة وعشرون اصبعاً والاصبع

سبع حبات شعير *The cubit is twenty four*

*digits, and every digit is six barley corns.* But this

is as uncertain as the former, and is built upon a

supposition, that all such are of the same dimen-

sion. Whereas those of one Country differ much

from those of another; and those of the same

Country (as I have made triall in *Egypt*, more

out of curiosity, then as hoping this way to give

my self satisfaction) are not all of the same big-

nesse: and not onely so, but in the self same ear,

there is a sensible difference, as experience doth

shew. And yet *Snellius*, a man much to be

commended for his abilities in the Mathema-

ticks, and to be blamed for his supine negli-

gence, both in his measure of the magnitude

of the earth, and in his dimensions of the Ro-

mane foot, upon these sleight & weak principles,

deduces the Arabian foot, <sup>2</sup> *this containing ninety*

*six grains, such as his Roman foot (for none be-*

*sides himself will own it) contains ninety.* Where-

fore some other Arabians to mend the matter,

limit the breadth of one of them, <sup>2</sup> *by six hairs*

*of a camel, evenly joyned one by another; by*

which invention their derah being almost an-

the most exact of any in the East) limits their breadth by vi. hairs of an horse.

هر اصبع مقدار شش جو معتدل وعرض هر جو

مقدار شش قاره موي بال اسب

*Every digit is six barley*

*corns laid evenly together, and the breadth of every barley corn is six haire*

*of an horses taile, Instit: Astron: Aly Cushgy. MS.*

swerable

swerable to the Romane *sesquipes*, or cubit, shall consist of twenty four digits, and every digit of sixe barley corns, and every barley corn of six hairs of a camell. So that in conclusion the hair of a camell, shall be the *minimum* in respect of measures. But this invention however at the first it may seem somewhat subtile (for we are come now almost as low as atomes) is least of all to be approved. For though the supposition were true that all hairs are of a like bignesse in all camels, whereas they are different in one and the same; yet this objection is unanswerable, that seeing hairs are not perfectly round, though the the sense judges them so, but angular, and that with some inequality, as magnifying glasses plainly demonstrate, it will be very difficult so to size them together, that they shall always take up the same breadth: and if they do not, little errors committed in such small bodies, though at the first insensible, will infinitely increase, and multiply, in the measuring of great distances, to which these are supposed the foundation. And therefore I cannot but approve the counsell of *Villalpandus*, who adviseth such as will examine measures and weights, to begin with the greater, and not with the lesser. And that there is reason for his assertion, may be made evident, especially in weights, to such as shall make an experiment. For admit there were a Standard of ten thousand grains, and another of one grain, it will be easie, by a continued subdivision of the former, with a good balance, to produce a weight equall to the standard of one grain: yea, though at the beginning,

*Villalpandus*  
de apparatu  
Vrbis ac Templi  
par. 2. l. 3. c. 25.  
Atque in uni-  
versum illud  
unum monitos  
velim eos om-  
nes, qui mensu-  
rarum ac pon-  
derum cognos-  
cendorum desi-  
derio tenentur, ne  
à minimis inci-  
pant examina-  
re majora: nam  
vel minimus  
quisque error  
sæpius multi-  
plicatus in  
magnum addu-  
cit errorum  
cumulum.

ning, some little error had been committed, which after many divisions will vanish, and become imperceptible. Whereas on the contrary, the most curious man alive, with the exactest scale that the industry of the most skilfull artizan can invent, shall never be able out of the standard of one grain, to produce a weight equall to the weight of ten thousand grains, but that there shall be a sensible, and apparent difference; yea, though he had that excellent scale mentioned by <sup>c</sup> *Capellus* at *Sedan*, which would sensibly be turned with the  $\text{IV.}$  hundredth part of a grain. The like difference as we find in weights, we may conceive by analogy to be in measures, when they shall be made out of such little parts, as hairs, barley corns, digits, and the like. And therefore I cannot but disapprove the ordinary course of most Geographers, whether Greeks, Latines, or Arabians, that from such nice beginnings, measure out a degree upon earth, and consequently the magnitude of this globe. On the contrary the enterprize of <sup>d</sup> *Snellius* in his *Eratosthenes Batavus*, and of our Countryman <sup>c</sup> *M. Wright*, hath been more commendable: who by the space of a degree on earth, (or which were better of many degrees) have endeavoured to fixe measures, with more exactnesse, and certainty for posterity. But of this argument I shall have occasion to speak hereafter. And therefore to return to the business in hand.

Since the Romane foot cannot be recovered by hairs, grains, digits, palms, and such like physical bodies, which being of a various, and indeterminate magnitude, cannot give, unlesse by

<sup>c</sup> *Capellus de pond. & nummis lib. 1.*

<sup>d</sup> *Snell: in Eratosthen: Bat. lib. 2.*

<sup>c</sup> *Wright, of the errors of Navigation.*

accident, the commensuration of that which ought to be precisely limited, and determined: some relinquishing the former way as erroneous, have endeavoured, with much ingeniousness, by weights, to find out the Roman foot. For there is the same analogy between measures and weights, as between continued, and discrete quantities: And as Mathematicians by numbers demonstrate, or rather illustrate the affections of lines, superficies, and Geometricall bodies: so by weights, measuring some physicall bodies, especially such as are liquid, in cubicall vessels, (which are easiest commensurable) we may render the exact quantity of the Romane foot, and by consequence of all their other measures. And therefore <sup>f</sup> *Lucas Patus*, and <sup>s</sup> *Villalpandus*, have attempted with probable reasons to discover the Romane foot, the one by the *Sextarius*, the other by the Romane *Congius*. For the *Sextarius* being the sixth part of the *Congius*, and the *Congius* containing X. *librae*, or pounds, as it is manifest by that exquisite standard in *Rome*, with this inscription.

<sup>f</sup> *Luc. Patus*  
li. 3. de mensur.  
& pond: Rom.  
<sup>s</sup> *Villalpandus*  
de appar. Urbis  
ac Templi. par:  
2. l. 3. cap. 25.

IMP. CÆSARE  
VESPAS. VI  
T. CÆS. AUG. F. IIII<sup>cos</sup>  
MENSURÆ  
EXACTÆ IN  
CAPITOLIO

P X

P X signifies  
Pondo decem.

<sup>b</sup> *Fragmenta  
Dioscoridis.*

<sup>i</sup> *Sext. Pomp:  
Festus de Verbo  
signif.*

<sup>k</sup> *Rhemn: Fann:  
fragment.*

Again the *Congius* being the eighth part of the *amphora*, or *quadrantal*, filled with water or wine, as by the testimonies of <sup>b</sup> *Dioscorides*, <sup>i</sup> *Sext: Pompeius*, and of an ancient Anonymus Greek Authour translated by *Alciat*, it doth appear: if therefore a Vessell be made of a cubicall figure, which may receive *VIII. congii*, or *XLVIII. sextarii*, or *LXXXIII. pounds* of water or of wine, out of the sides of this cube, by <sup>k</sup> *Rhemnius Fannius* his description, or rather by *Sextus Pompeius*, who is ancients, will the Romane foot be deduced. For both these write (neither is it as yet contradicted by any man) that the longitude of one of the sides of the *amphora* (being a cube) is answerable to the Romane foot. And here our inquiry would be at an end (supposing the Authorities of *Festus*, and *Fannius* to be unquestionable) were there not farther some objections, which cannot easily be removed. And those are first, a supposition that we have the true Roman *libra* (for by this we are to finde the *Congius*, admitting there were none extant, as by the *Congius*, the *amphora*, or *quadrantal*): a thing of as great difficulty as the foot it self. And besides, if this were obtained, yet we cannot have an absolute certainty, that water, or wine, shall in all places alike ponderate; by reason of the different gravity, which is observed in naturall bodies, though they be homogeneous, and of a like substance. Wherefore laying aside all such speculations, as being farre from that accuratenesse, which is required, there is no other possible means left for this discovery, but to have recourse to such monuments of Antiquity,



iquity, as have escaped the injury, and calamity of time, which is our next, and second inquiry.

And here it will not be amiss to see what learned men, who not long preceded our age, have observed out of ancient monuments, concerning the Romane foot: and then to relate what course I took to give my self private satisfaction, which, I hope, will be also satisfactory to others. Philander in his Commentaries upon Vitruvius, being one of the first that had seen, and diligently perused many ancient measures in Rome (whereas Portius, Agricola, Glareanus, and some others, received them upon trust) gives us so much the more certain information. His words are these: <sup>1</sup> *Veruntamen quoniam non statim ex cujuscunque pollicibus, aut digitis, quis fuerit apud antiquos Romanus pes sciri potest, facturum me studiosis rem gratam putavi, si ad marginem libri semipedem apponerem, dimensum ex antiquo pede, in marmore, quod est in hortis Angeli Colotii Romæ sculpto, cujus etiam, nisi me fallit memoria, meminit Leonardus Porcius lib. de Sestertio. Eum enim pedem, nos ceteri qui circumferuntur, pratulimus, quod conveniret cum eo, quem sculptum invenimus in alio marmoreo epitaphio T. Statilii Vol. Apri mensuris ædificiorum, quod operâ Jacobi Meleghini summi Pont. Architecti ex faniculo non ita pridem refossus, in Vaticanum hortum translatus est. Quamvis*

<sup>1</sup> Philander in li. 3. cap. 3. Vitruvii,

*jacentem in Basilicâ Apostolorum columnam ex porphyrite, cum his Græcis in calce literis ΠΟΔ. Θ. id est pedum novem, nos cum dimensi essemus, deprehenderimus non respondere nostro eum, quo*  
*usus*

usus fuerat ejus columna artifex, sed nostro esse majorem duobus scrupulis & besse, id est uncia parte nonâ. Vt argumentum aliquod esse possit pedis Graci fuisse modulo scapum columna factum; quod facilius conjicere potuissim, si integra esset alia ex eodem lapide columna, quam in viâ latâ est conspiciere jacentem, his in calce literis ΠΟΔ ΙΒ insignitam. Verum quando stadium Herodoto l. 2. Heroni, Suida, ceteris Gracis sit sexcentorum pedum; Plinio, Columella, ceteris Latinis sexcentorum viginti quinque nostrorum, necesse est Romanum à Graco semunciâ superari. Thus far Philander. Not long after him Lucas Patus, having examined the foot on T. Statilius tombe, and that other of Cossutius, together with several ancient ones in brasse, found amongst the

<sup>m</sup> Luc. Patus l.  
1. de antiq. Rô.  
& Grac. intervall. mensuris.

rudera at Rome, concludes: that the <sup>m</sup> true Romane foot dictis duobus marmoreis comparatus, septimâ uncia parte, sive uncia scrupulis tribus, & duobus scrupulis sextulis, & sextula semisse brevior est. Much about the same time I finde in Ciaconius out of Latinus Latinus, another experiment to have been made, by many eminent men together at Rome. Superioribus autem annis (saith<sup>n</sup> he) Ant: Augustinus, qui postmodum fuit Archiepiscopus Tarraconensis, Io: Baptista Sighicellus Episcopus Faventinus, P. Octavius Pacatus, Achilles Maffæus, Achilles Statius, Benedictus Egius, Fulvius Ursinus, Latinus Latinus, cum veram pedis Rom. quantitatem statuere vellent, plures ejusd. pedis mensuras simul contulerunt, & earum octo cum antiquissimâ dicti pedis formâ, qua in basi quâdam in hortis Vaticanis extat, adamussim convenire videntes, ex  
hoc

<sup>a</sup> Ciaconius è  
Lat. Latinii  
observationibus  
de pede Rom.

C

making the Rhinland foot equal to the Romane. The proof of his assertion is taken from an ancient Romane *armamentarium*, or Fort, neer the sea, not far from *Leiden*, which by the Natives is called *het huys te Briten*: And is supposed by *Ortelius* to have been built by *Claudius Caesar*, in his intended voiage for *Britanne*, of which \* *Suetonius*, and *Dio*, make mention: *sive in commo-*  
*diores legionum, cohortiumque transvectionem,*  
*sive quo milites hibernarent.* (saith *Ortelius*). *Arcis*  
*ipsius fundamenta*, (according to <sup>9</sup> *Snellius*) *qua-*  
*dratâ sunt formâ, & quaquaversum ducentis qua-*  
*draginta Rhinlandicis pedibus patent. Vt vel hinc*  
*Romane mensurae vestigia quàm planissimè agnos-*  
*cas. Nam ipsius podismus duorum Romanorum ju-*  
*gerum magnitudinem complectitur. Juxta enim*  
*mensuram ducentos & quadraginta longitudinis*  
*pedes esse, non est ferè quisquam qui ignoret, inquit*  
*Quintilianus l. 1. cap. 10. Varro de re rustica li-*  
*bro 1. cap. 10. Jugerum quod quadratos duos ac-*  
*tus habet. Actus quadratus, qui & latus est*  
*pedes 120. & longus totidem. Is modius, ac mina*  
*Latina appellatur. ut mihi planè dubium non vi-*  
*deatur, eos hic Romana mensura modum secutos,*  
*hujus structurae podismum ita comprehendisse se-*  
*cundum jugeri mensuram, ut duo jugera, vel*  
*actus quatuor contineret. Frontinus de limitibus.*  
*Hi duo fundi juncti jugerum definiunt, deinde hac*  
*duo jugera juncta in unum quadratum agrum*  
*efficiunt, quòd sint omnes actus bini: ut singula*  
*ideò latera ducentos & quadraginta pedes in lon-*  
*gum patère necesse sit. Atqui totidem pedibus*  
*Rhinlandicis singula latera exporrigi Geodetarum*  
*experientia confirmat. Unde efficitur Romanum*

anti-

\* *Suetonius* in  
*Claudio*  
*Dio hist. Rom.*  
*lib. 60.*

<sup>9</sup> *Snell. in Era-*  
*tostr. Bat. l. 2.*  
*cap. 2.*

*antiquum pedē nostro Rhinlandico planè equari.*

After these experiments of so many able, and learned men, and those too taken from ancient Monuments, it may seem strange, that we should not be able as yet to define the true quantity of the Romane foot. For this I can assigne no other reasons then these, First, that those which have described it, have either not exactly, and with such diligence, as was requisite, performed it; or else, if they have been circumspect in this kind, they have omitted to compare it with the Standards for measures of other Nations. On the contrary, those which have compared it with the present Standards, never took it from the ancient Monuments, and Originals, which are at Rome, but onely from some draughts, or schemes, delineated in books. Now how uncertain a way this is, doth appear by *Villalpandus*, who thus writes. *Ego dum hac scriberem, hunc Colotianum pedem circino expendi, & in annotationibus Guili: Philandri solertissimi viri, & apud Georgium Agricola, & apud Lucam Patum, & Stanislaum Grsepsium, & nullum potui reperire alteri aequalem, imo verò neque ejusdem pedis assignatas similes partes.* The same have I observed in those Romane feet described by *Portius, Agricola, Philander, Patus, Ciaconius*, and *Villalpandus* himself, that they differ one from another: and not onely so, but those of the same Authour, in the same impression, are likewise different. Which last must arise, either by the diverse extention of the paper in the presse, when it is moist, or by the inequall contraction of it, when it grows dry, or by some

*Villalpand. de  
apparatu Urbis  
ac Templi par.  
2. l. 3. c. 25.*

*Pars sexagesima typorum & formarum longitudini excusis decessit, quemadmodum à diligentibus & peritis typographis sciscitando edoctus sum.*  
*Snell. in Eratosth. Batavo: l. 2. cap. 1.*

other accident, in the beating, and binding. So that though it were granted, that so many learned men had found out, what we inquire after, the Romane foot; yet it is impossible out of those schemes, and draughts, delivered in their books, for the reasons before specified, to attain an absolute certainty. But *Snellius* shews us a remedy of this difficulty, which in my opinion is as vain as his Romane foot, (seeing by his supposition all paper must shrink alike, be it thick or thinne) and that is, to allow one part in sixty for the shrinking of the paper. For so much, saith he, *doe Typographers observe, that letters contract themselves, when they are taken off wet from the types.*

Wherefore having received small satisfaction from the writings of the Ancients, and not much better from the imperfect designations of the Romane foot by modern Authors, I proposed to my self in my travails abroad, these waies, which no reasonable man but must approve of. And those were first, to examine as many ancient measures, and monuments, in *Italy*, and other parts, as it was possible. And secondly, to compare these with as many Standards, and Originals, as I could procure the sight of. And last of all, to transmit both these, and them, to posterity, I exactly measured some of the most lasting monuments of the Ancients. To this purpose, in the year 1639 I went into *Italy*, to view, as the other Antiquities of the Romanes, so especially those of weights, and measures; and to take them with as much exactnesse, as it was possible, I carried instruments with me made by the best Artizans,

Where

Where my first inquiry was after that monumēt of *T. Statilius Vol. Aper*, in the Vatican gardens, from whence *Philander* took the dimensions of the *Romane foot*, as others have since borrow-<sup>Philander in l. 3. c. 3. Vitruv. vii.</sup> ed it from him. In the copying out of this upon an English foot in brasse, divided into 2000 parts, I spent at the least two houres (which I mention to shew with what diligence I proceeded in this, and the rest) so often comparing the severall divisions, and digits of it respectively one with another, that I think more circumspection could not have been used; by which I plainly discovered the rudenesse, and insufficiency of that foot. For besides that the length of it is somewhat too much, (whatsoever <sup>Latinius</sup> out of an observation made by *Ant. Augustinus, Sighicellus, Pacatus, Maffaus, Statius, Ægins,* and *Fulvius Ursinus*, pretends to the contrary) there is never a digit, that is precisely answerable to one another. Howsoever it contains 1944 such parts, as the English foot contains 2000.

*Ciaconius & Latino Latinio.*

My next search was for the foot on the monument of *Cossutius*, in *hortis Colotianis*, frō whence it hath since received its denomination (though it be now removed) being termed by Writers *pes Colotianus*. This foot I took with great care, as it did well deserve, being very fair, and perfect: afterwards collating it with that *Romane foot*, which *Lucas Patrus* caused to be ingraven in the *Capitol*, in a white marble stone, I found them exactly to agree; and therefore I did wonder, why he should condemne this with his pen (for he makes some

\* *Luc. Patus l. 1 de antiq. Rom. & Grec. intervall. mensuris.* objections against it ) which notwithstanding he hath erected with his hands (as appears by the inscription in the Capitol, C U R A N T E L U : P A E T O). It may be upō second thoughts, he afterward privately retracted his error, which he vvas not willing to publish to the vworld. Now this of *Coffutius* is 1934. such parts, as the English foot contains 2000.

Next I sought after that Porphyry Columnne mentioned by \* *Marlianus*, as also by \* *Philander*, and others, with this inscription ΠΟΔ. Θ. For if the length of that Columnne were assigned according to the proportion of the Greek foot, then would the Romane foot be thence deduced : this (as I shall elsewhere shew) containing 24. such parts, as that contained 25 : Or if it were made according to the Romane foot, as the Grecians after their subjection to the Romane Empire, often used the same measures that the Romanes did, then had I my desire. But the Column being defaced, or lost, my labour was in vain : And it seems \* *Patus* about LXX. years before, made the same inquiry, with as little satisfaction.

\* *Luc. Patus l. 1 de antiq. Rom. & Grec. intervall. mensuris.*

I should be too tedious in describing the severall feet, which I have perused in brasſe, found amongst the *rudera* at Rome, and carefully preserved by Antiquaries : of most of which *Peireskijus* hath given a good character, in some letters of his, which I have seen in the hands of *Buchardus*, a learned man, not yet printed. \* Who thus writes : I cannot sufficiently wonder at the inequality which I have found in the divisions by digits, and inches, of the ancient

\* *Ex Epistolis Peireskij MSS.*



cient Romane feet ; which seem to me to have been made for fashion sake, & *dicis causâ* (as lamps that are found in tombes incapable of oile) more to expresse the mystery, and profession of those that were to use them, then for to regulate the measure of any thing besides them.

Besides these, I examined the ancient structures of the Romanes, hoping by collating one with another, to deduce the dimension of their foot. For I presumed that those excellent Architects, before they began their work, must necessarily propose some models to themselves, according to the proportions of which, they meant to raise their fabricks: which proportions could not be assigned, but in the parts of some common, and received quantity; and this in probability was the Romane foot; being a measure generally used, and by publick authority prescribed. Upon which grounds, I measured the stones in the foundation of the Capitoll, Domitians', or rather Vespasians' amphitheater, the triumphall arcs of Titus, and Severus, together with that of Constantine the great, and above all that exquisite temple of the Pantheon, built by Agrippa, I know not whither with more cost, or art: concerning which <sup>b</sup> Sebast. Serl: <sup>b</sup> Sebast. Serl: is of opinion, that if all rules of <sup>delle Anti-</sup> Architecture were lost, they might be revived out <sup>chita.</sup> of this monument alone. And in truth, this place gave me more satisfaction then any other. For most of the white marble stones on the pavement, contained exactly three of those Romane feet on *Cossutins'* monument, and the lesser stones in Porphyry contained one and an half.

But yet I thought this not sufficient, unlesse I

went to *Tarracina*, which is the ancient *Anxur*, and *LIII.* miles distant from *Rome*: having read in *Andreas Schottus*, out of *Pighius' Hercules Prodicus*, that neer the sea by the *via Appia*, in the height of a white rock, whence that of *Horace*,

\* *Andr. Schott:*  
*Itinerar.*

\* *Horat. l. i.*  
*Serm. Sat. 5.*

*Impositum saxis latè candentibus Anxur*, there are described the Romane *decempeda*. And indeed the place is very memorable, for the whitenesse, altitude, and hardnesse of the rock, which notwithstanding is cut away perpendicularly, on the side towards the Tyrrhene sea, above an hundred and twenty feet in depth, to make passage for the Appian way; and at the space of every *decempeda*, these characters X XX XXX &c. (being almost *cubitales*) are fairly ingraven in a continued order descending to CXX. Measuring below the distance between CXX and CX, it amounted to *IX.* English feet, and  $\frac{1}{16}$  of a foot computing it from the \* line ingraven above CXX to the line next under CX. The rest I examined with my eyes, by often comparing the distance between CXX and CX whither it were equall to that between CX and C, and this again (ascending upwards) to that between C and XC, which manner though it be uncertain, and conjecturall, and farre from that exactnesse, I used in all others, yet it was the best means I could then put in practise; and I am confident that whosoever shall measure those spaces, shall find a manifest inequality. To which opinion I am the rather induced, because measuring there, in severall places, the breadth of the Appian way, cut out of the same rock, I found a difference sometimes of one, or two inches, or more. It being in one place

\* See at the end of this book the figure of these characters as they are cut in the rock at *Anxur*, with lines incom- passing them.

place  $\overline{\text{XIII}}$ . English feet, and  $\frac{163}{1000}$  of a foot, in another,  $\overline{\text{XIII}}$ . feet and  $\frac{1130}{1000}$  in a third  $\overline{\text{XIII}}$ . and  $\frac{1275}{1000}$ . Whereby I concluded, that the Ancients in making that way, had not respect to a Mathematicall point ( as it was not necessary ) but onely that if any difference were, it should not be sensible. And such differences have I observed in the white Corinthian pillars, in the Pantheon before mentioned, of above an inch, or two, in the circuit of the *scapus*, neer the *torus*: vvhich inequality, seeing no eye could discover, the masters of that exquisite vwork did justly contemn. Whereas the Porphyry stones, and those of white marble, on the pavement, are sized so eeven, and so exactly to the proportions of the Romane foot, that nothing can be more accurate. And this the nature of the vwork required. For the temple being round (which hath occasioned the *Italians* vulgarly to call it the *Rotundo*) the circle within, could not so exquisitely have been filled up, if there had not been a speciall care taken in observing the true dimensions, in every particular stone. But to return to the rock at *Anxur*; the spaces between those characters, to an eye, that shall be intently fixt upon them, will be apparently different. So that I concur in opinion with \* *Schottus*, that those figures were placed there, to give notice to posterity, how much of the rock had been removed, to make passage for the *Appian way*; and not for any memoriall of the Romane measures.

\* *Schotti itiner.*

Having measured those places in the *Appian way* at *Tarracina*, I made triall of at least  $\overline{\text{XX}}$ . others

\* *Columella de  
Re Rust. l. 5.*  
† *Isidorus l. 15.*  
c 15. *Origin.*

others between *Tarracina*, and *Naples*, without any great satisfaction; and therefore partly the incertainty that I found there, and partly the danger of thieves, discouraged me from measuring the Romane *milliare*; a work conceived to be of great use, for the discovery of the Romane foot. Seeing the *milliare* containing *mille passus*, as the very name imports, and every *passus* consisting of five feet, as \* *Columella*, and † *Isidorus*, expressly tell us, here therefore would be 5000 feet to help us to one, could there be but found out a perfect Romane mile. And this I imagined might probably be discovered amongst those many *vestigia* of Romane waies, which to this day are frequently seen in *Italy*. Wherefore conferring with *Gassaro Berti*, a man curious, and judicious (as appears by his ichnography of *Roma Subterranea* in *Bosius*) as also with *Lucas Holstenius*, a learned companion of *Cluverius*, in those honourable travails of his, for the restauration of the ancient Geography: they both informed me, that there are still in the Appian way, where it passes over the *Pomptina paludes*, severall *columna*, or *lapides milliarii*, standing; whereby the Romanes divided, and distinguished their miles; and which occasioned those phrases, *ad primū*, *ad quartum*, *ad centesimum lapidem*, and the like. And these, it may be, at the first were ordinary stones, till *C. Gracchus* caused columnes to be erected in their places: Διαμετρήσας καὶ μίλιον ὅσον πᾶσαν (τὸ δὲ μίλιον ἕκτω σταδίων ὀλίγον ὑπερβαίνει) λίθους λιθίνους σημεία τῷ μέτρῳ κατέστησεν. He measured out, saith ‡ *Plutarch*, *by miles all the waies,*

‡ *Plutarchus  
in Gracchis.*

maies, the mile containing litle lesse then eight stadia, and placed columnnes of stone to designe the measure. The thing vvas of that ornament, and use, as that it was afterwards taken up, and continued by the Romane Emperours; as appears by these inscriptions, which are fairly ingraven on the first columnne, found amongst the ruines in the Appian way, and from thence lately removed into the Capitol, by order of the \* Senate, and people of Rome.

\* S. P. Q. R

COLVMNAM. MILIARIAM  
PRIMI. AB. VRBE. LAPIDIS. INDICEM  
AB. IMPP. VESPASIANO. ET. NERVA  
RESTITVTAM  
DE. RVINIS. SVBVRBANIS. VIAE. APPIAE  
IN. CAPITOLIVM. TRANSTVLIT

I

IMP. CAESAR  
VESPASIANVS. AVG  
PONTIF. MAXIM  
TRIB. POTESTAT. VII  
IMP. XVII P. P. CENSOR  
COS. VII DESIGN. VIII

*Below this, on the end of the Scapus.*

IMP. NERVA. CAESAR  
AVGVSTVS. PONTIFEX  
MAXIMVS. TRIBVNICIA  
POTESTATE. COS. III PATER  
PATRIAE. REFECIT

*Below this, on the Basis  
of the same pillar.*

IMP. CAESARI. DIVI  
TRAIANI. PARTHICI. F  
DIVI. NERVAE. NEPOTI  
TRAIANO. HADRIANO  
AVG. PONTIF. MAXIM  
TRIB. POTEST. II COS. II  
VIATORES. QVI. IPSI. ET. COS. ET  
PR. CETERISQVE. MAGISTRATIB  
APPARENT. ET. H.V.

To these I shall also add the inscription of another *columna milliaria*, not extant in *Gruterus*, or any other, that I know, which I have seen at *Tarracina*; the columnne being exactly of the same magnitude with the former, but wanting by the injury of time, a *basis* below, & a globe, of nigh three feet diameter on the top, serving instead of a capitel, both which the former hath.

## X

IMP. CAESAR  
 DIVI. NERVAE  
 FILIVS. NERVA.  
 TRAIANVS. AVG  
 GERMANICVS  
 DACICVS  
 PONTIF. MAX  
 TRIB. POT. XIII  
 IMP. VI COS. V P. P  
 XVIII SILICE. SVA. PECVNIA  
 STRAVIT

## LIII

*Appii forum.* For it was  $\overline{X}$ . miles from *Tarracina*, and  $\overline{IX}$ . from *Appii forum*; as appears by the *Itinerarium Hierosolymitanum* in *Bertius*.

Appii forum  
 Ad medias IX.  
 Tarracina X.

The figure  $\overline{LIII}$  below, signifies the distance of *Tarracina* from *Rome*; Which distance may be farther proved out of *Appian*, in his third book of the *Civill wars*, speaking of *Augustus*:  $\text{ὅτι αὐτὸ πρὸς Ταρρακίνας ἦν τετρακοσίαι περὶ πόλιν στάδιον.}$  Being about *Tarracina*, which is distant  $\overline{CCCC}$ . *stadia* from *Rome*. These *stadia* reduced to miles, if we allow  $\overline{VII}$ . Greek *stadia*, and an half, to a *Romane mile*, as *Suidas* doth, will make up  $\overline{LIII}$ . miles, and one third part of a mile; that is, two *stadia*, and an half over and above. Which fraction *Appian* neglects; and therefore uses the round number  $\overline{CCCC}$ . *stadia* for  $\overline{LIII}$ . miles.

The figure  $\overline{XVIII}$  signifies the *Decennovium*, or way passing over the fens, between *Appii forum*, and *Tarracina*: so denominared; because it contained nineteen miles in length: which may also be proved out of *Procopius*, where he speaks of the  $\Delta\epsilon\kappa\alpha\nu\nu\omicron\sigma\iota\omicron\nu$ . This way was paved by *Traian*, as the inscription shews; and I think first of all by him. Long after it was repaired by *Theodoricus*, according to another inscription, that I have seen at *Tarracina*, of which *Gruterus*, and *Cluverius*, also make mention; where, omitting the titles of *Theodoricus*, in the marble we finde these words engraven.

DECEN-

\* The figure  $\overline{X}$  signifies the distance of *Tarracina* from the next City, or Town, in the way to *Rome*: And that was, *Ad medias*: a place so called, either because it was, *ad medias paludes*, or else because it was in the midway almost between *Tarracina*, and

DECENNOVII. VIAE. APPIAE. ID. EST. A; TRIP  
 VSQVE. TERRACENAM. ITER. ET. LOCA. QVAB  
 CONFLVENTIBVS. AB. VTRAQVE. PARTE. PALVDVM  
 PER. OMNES. RETRO. PRINCIPVM. INVND AVERANT  
 VSVI. PVBLICO. ET. SECVRITATI. VIAN TIVM  
 RESTITVIT. PER  
 PLVRIMOS. QVI. ANTE. NON. ERANT. ALBEOS  
 DEDVCTA. IN. MARE. AQVA

By this number XVIII. signifying the *decennovium*, and by the *Itinerarium Hierosolymitanum*, we may safely correct the *Itinerarium Antonini*, in which *Tarracina* is placed but XVIII. miles distant from *Appii forum*. And from hence likewise we may certainly know how farre the Christians went to meet Saint Paul, and that was XXXIV. miles. For so much was *Appii forum* distant from Rome, if we subduct XVIII. out of LIII. whereas the *Itineraries of Bertius* Edition make it more.

If therefore two such columnes were found intire, (as I am informed there are four, or five, in the *Decennovium*, standing in a continued order) the distance between two such being exactly measured, vould much conduce to the discovery of the Romane foot. Upon vvch supposition, I had almost resolved to have gone thither, as I did to other places, vvith no other intention, but only to have been a spectator of those Columnes, and to have trusted to mine own hands, in taking their distances. But upon a more deliberate examination of the businesse, I perceived that this inquiry did depend upon a very nice supposition. For if the *Decempedatores*, or *Curatores viarum*, proceeded not with extreme caution, and aimed almost at a Mathematicall point, in designing the just space of each particular mile (which in a work of that length



length is not probable; vvhhere the inequality of many feet could not be discerned by the eye, and might be admitted without any blemish. For in \* *Varro's judgement, Sensus nullus quod abest mille* \* *Varro de L. L. passus sentire potest*) it could not be, but the same *lib. 5.* differences, or somewhat like, must have crept in with them, which have been observed amongst us, in our measured, and statute miles; out of vvvhich it vvould be a vain attempt exactly to demonstrate the English foot. The neglect of which circumspection, amongst some other reasons, that may be assigned, I take to be one, of the diversity, which Astronomers found in that memorable observation, made in the planes of Singiar, or Sinar, by the command of *Almamoon*, the renowned Calife of Babylon, about eight hundred years since, in proportioning the magnitude of a degree upon earth. For having taken the altitude of the pole at two severall stations, differing a degree in the heavens, they measured the distance between these stations on earth, going on in the same Meridian; where <sup>h</sup> *some of them*, saies *Abulfeda*, found it to be fifty sixe miles, and two thirds, others fifty six, without any fraction. If therefore the Romane *decempedatores*, or *geodetae*, used not more circumspection, then the Babylonian Astronomers (which is not likely), there can be no trust given to their miles, and lesse trust to the foot, that shall be deduced from thence.

Wherefore to come to a conclusion; having made inquiry more waies, then it may be any man hath done, and I think vvith as much caution, and exactnesse, as any, it will be necessary after

فكان  
م—ع  
اجديهما  
ستة  
وخمسون  
ميلا وثلثا  
وم—ع  
الاخري  
ستة  
وخمسون  
ميل بغير  
كسر

*Abulf. Geogr.*  
*Arabs MS.*

after all to shew amongst so many feet, as are taken to be Romane, vvhich I conceiue to be the most genuine, and true. And though in such an incertainty, and scarcity of ancient monuments, and in such a diversity of opinions, amongst modern Writers, it may seem too great presumption, positively to define the magnitude of the Romane foot; yet having had the opportunity, to have perus'd in this kind, more antiquities, then any that have preceded, I may with the more confidence conclude, that the *Pes Colotianus*, in my judgment, is the true Romane foot; and that for these reasons.

For first, it most exactly agrees with some very ancient, and perfect Romane feet in brasſe, found long since amongst the *rudera* at Rome: especially with that excellent one (as I remember) of *F. Vrsinus*, a learned Antiquary. Though I cannot deny but that I have seen two ancient feet in brasſe, different from this; the one of *Gualdus*, a very fair one, wanting two parts and an half, of such as this contains a 1000. a small, and inconsiderable difference. The second of *Gottifridus*, a Gentleman of honourable quality, (to vvhom I stand obliged for the free donation of severall antiquities) which exceeds it by eight parts; but this last hath been made by a very rude, and unskilfull hand.

Next, the proportions of almost all the white marble stones, as also of those lesser in porphyry, in the pavement of that admirable temple of the *Pantheon*, are either completely three of these feet, or one and an half; which,  
it

it is not probable, in a structure of so much art, should have been the work of chance. Add to this the dimensions of severall stones, in the foundation of the *Capitol*, in *Titus*, and *Severus*, triumphal arc's, corresponding either to the whole foot, or conjointly to the whole, and some *uncia*, or digits of it.

Thirdly, the inscription on the same monument, where this foot is found, of the *circinus*, the *libella*, the *norma*, and the like, plainly shew that these were intended to expresse *Cossutius'* profession, (whom *Luc. Patrus* imagines to have been a *sculptor*) and this being intended, I see no reason why the *Romane foot* should have been cut in so fair a relevy, either too short, or too long; when the same hand, and the same pains, might have made it exact. It is true; that the foot upon *Statilius'* tombe, is 1944. such parts, as this is but 1934. whereof the English foot taken by me from the iron yard, or standard of three feet in *Guildhall* in *London*, contains 2000: but how rudely in respect of digits, that foot of *Statilius* is described, I have before discovered. And therefore I wonder that *Philander* in his Commentaries upon *Vitruvius*, should in a matter of such high concernment in Architecture; proceed with so much inadvertency; affirming that between this of *Statilius*, & that of *Cossutius*, there is no difference. And if he a Mathematician, hath thus erred; (though commonly men versed in those sciences take not up things at too cheap a rate, without due examination) what opinion may we conceive of another observation, made at the same monument;

*Luc. Patrus lib. de antiq. Rom. & Græc. interval. mens. suris.*

*Philander in li. 3. c. 3. Vitruv. vii.*

<sup>1</sup> *Ciaconius* &  
*Latini Latini*  
*observ. de pede*  
*Rom.*

ment, by <sup>1</sup> *Ant. Augustinus*, <sup>70</sup> *Baptista Sighi-*  
*cellus*, *P. Octavius Pacatus*, *Achilles Maffam*,  
*Achilles Statius*, *Renedictus Egius*, *Fulvius Vrsi-*  
*nius*, *Latinus Latinus*, with as many ancient  
feet, as there were men present? I shrewdly  
suspect they slubbered over their observation, as  
not regarding in nineteen hundred parts, and  
better, the small excess, or defect, of ten parts:  
or not rightly apprehending what might be  
the consequences of such an error, how little  
soever, in measuring the vast magnitude of the  
terrestrial globe, or of the celestial bodies.

Lastly, besides the authorities of *Portius Vi-*  
*centinus*, *Georgius Agricola*, *Glareanus*, *Ghetaldus*,  
*Donatus*, and of many other learned, and judici-  
ous men, who approve of this *Pes Colotianus*,  
(though bare authority is the worst, because the  
weakest kinde of argument) that excellent *Con-*  
*gius* of *Vespasian*, now extant in *Rome*, so highly  
and so justly magnified by <sup>m</sup> *Villalpandus*, may  
likewise serve to confirm, if not totally my asser-  
tion, yet thus far, that I have not exceeded in  
assigning the true longitude. For by the cleer  
evidences of <sup>n</sup> *Dioscorides*, and of an *anonymus*  
*Author* before cited, eight *Congii* are the just  
measure of the *Romane amphora*, or *quadrantal*,  
and again by as many testimonies of <sup>o</sup> *Sextus*  
*Pompeius*, and <sup>p</sup> *Rhemnius Fannius*, each of the  
sides of the *amphora* is equall in longitude to the  
*Romane foot*. Wherefore having procured by  
speciall favour the *congius* of *Vespasian*, I took  
the measure of it with <sup>\*</sup> *miliun* (being next to  
water, very proper for such a work) carefully  
prepared, and cleansed, which being done, with  
much

<sup>m</sup> *Villalpandus*  
*L. 2. disp. 2. c. 11*

*de apparatu Vr-*  
*bis ac Templi.*

<sup>n</sup> *Fragmenta*  
*Dioscoridis.*

<sup>o</sup> *Sext. Pomp.*  
*Festus de Verb.*  
*signif.*

<sup>p</sup> *Rhemn Fann.*  
*carm. fragm.*

<sup>\*</sup> It had been  
better to have  
made my expe-  
riment with  
water, and then  
to have weigh-  
ed it with an  
exact balance:  
but becaule no  
balances are  
found in *Rome*  
so exact as with  
us, I was fain  
to measure it  
with *miliun*.

much diligence. I caused a cube to be made answerable to the true dimension of the *Pes Colotianus*; filling up the capacity of which, and often reiterating the same experiment, I found continually the excess of about half a *congius* to remain; and that an *amphora* made by the *Pes Colotianus*, would contain but VII. *congii*, and about an half. And therefore I cannot sufficiently wonder at the observation of *Ant. Augustinus*, *Pacatus*, *Maffaus*, *Statius*, *Vrsinus*, and others, with a cube of that foot, which is described on *Statilius*' monument: who affirme the *quadrantal* of this exactly to contain eight of these *congii* of *Vespasian*. Whereas upon due examination I confidently affirm, that they have erred. And therefore *Villalpandus* in this particular, with more judgement, and ingenuity, hath published his observation, concerning the measure, and precise weight, of *Vespasian*'s *congius*, then any other whatsoever. Although I cannot be induced to assent to that deduction, which he infers of the *Romane foot*, (from the side of a *quadrantal* containing eight of these *congii*) relying upon the authorities of *Festus*, and *Fannius*, against so many evidences, produced to the contrary. Wherefore as he is singular in his opinion (for there is not one author of credit, which follows his assertion) so is his foot as singular, there being not one, of at least ten ancient ones, in the hands of severall Antiquaries (besides those inscribed on two Monuments in *Rome*) which arrive to the proportions of his, by XXVII. parts in 2000. As for those other fancies of his (for they are no bet-

*Ciaconius & Latini Latini observationibus de pede Rom.*

*Cum veram pedis Rom. quantitatem statuere vellent ejusd.*

*pedis mensuras*

*simul contulerunt, & earum*

*octo cum antiquissima disti-*

*quissima disti-*

*pedis forma,*

*que in basi quad-*

*dam in hortis*

*Vaticanis ex-*

*stat, adamussim*

*convenire vi-*

*identes, ex hoc*

*pede quadrato*

*vas confecerunt*

*&c. Vide*

*Supra.*

*Villalp. de*

*apparatu Urbis*

*ac Templi par.*

*2. lib. 3. c. 25.*

\* *Vides etiam  
latus cubicum  
modii, semicon-  
gii, sextarii, he-  
mina &c. Vil-  
lalp. ibidem.*

ter) of describing also the Romane foot, by the altitude of *Vespasians' congius*, and assigning the *latus cubicum*, of the *modius*, the *semicongius*, the *sextarius*, and *hemina*, from certain parallel circles circumscribed about it, (vvhich certainly, as the scheme of the *congius* it self, drawn by me to the full proportion, shews, were delineated without any farther intention then for ornament) I doe not think them worth the consultation.

And therefore it will be much better to give some solution to those authorities of *Sextus Pompeius*, and *Rhemnius Fannius*, alleaged by him. For the objection vvhich may be raised thence is very materiall: How the *Pes Colotianus* can be the true Romane foot, since it is confessed by me, that it doth not precisely answer to the sides of a *quadrantal*, or cube, containing eight of those *congi* of *Vespasian*, or *XLVIII. sextarii*? Whereas on the contrary, *Festus* expressly writes, that the *quadrantal* was the square (he means the cube) of the Romane foot.

\* *Sext. Pomp.  
Festus de Verb.  
signif.  
\* Rhemn. Fan-  
nii carmina de  
pond. & men-  
suris.*

*Quadrantal vocabant Antiqui, quam ex Græco amphoram dicunt, quod vas pedis quadrati, octo & quadraginta capit sextarios.* And \* *Fannius* confirms the same.

*Pes longo spatio, latoque notetur in anglo,  
Angulus ut par sit, quem claudit linea triplex.  
Quattuor ex quadris medium cingatur inane:  
Amphora fit cubus: quam ne violare liceret,  
Sacravêre Iovi Tarpeio in monte Quirites.*

We might elevate their authorities by saying, these are only the testimonies of two Gram-  
marians,

marians, better versed in disputes of vvords, then  
 criticall in measures, which more properly are  
 the speculation of Mathematicians: and there-  
 fore if *Vitruvius* had affirmed it, much  
 more credit might have been given. But we  
 shall rather say, they wrote vvhat was vulgar-  
 ly, and commonly, upon tradition beleevd,  
 that the length of one of the sides of the *ampho-  
 ra* was equall to the Romane foot: not that  
 it was precisely, and exactly equall, but that of  
 any known measure vvhatsoever then extant,  
 this came the neereſt to it, as indeed it doth;  
 yea, so neer, that if at this day the *amphora*,  
 and Romane foot, were in use amongſt us, ma-  
 ny a writer that had never been so curious, as  
 diligently to compare them, would not be scrup-  
 ulous to affirm as much. Which may appear  
 by the practise of *Ant. Augustinus*, *Pacatus*,  
*Maffens*, *Statius*, *Vrsinus*, and of severall other  
 learned men, not long before our times: Who  
 though they purposely made it their inquiry, to  
 discover the true Romane vveights, and mea-  
 sures, and therefore made speciall use of this  
*Congius* of *Vespasian*, yet have no lesse erred, as  
 we shewed before, in the dimension of the *am-  
 phora*, then both *Festus*, and *Fannius* have done.  
 Neither will this answer seem improbable con-  
 cerning measures, if we shall examine a place,  
 or two, concerning coins, in which the anci-  
 ents, and those too of the better sort of Au-  
 thors, have in the very same manner erred. For  
 y *Livy* writing that *Marcellus* gave to *L. Ban-  
 tius* (or *Bandius*) *Id. bigati*, that is *denarii* (so  
 called because the *biga* was ordinarily stamped

<sup>a</sup> *Plutarchus* in *Marcello*. upon the reverse of the *Denarius*): <sup>2</sup> *Plutarch* describing the same gift, renders it by so many *drachma*, the Grecian manner of computation; not that the *drachma* in the exact, and intrinsecal valuation, was equall then to the *Denarius*, or the *Denarius* to the *drachma* (as we shall shew in the ensuing discourse) but that in the vulgar, and popular estimation, the one passed for the other, being both not much different in their weight, as well as valuation. <sup>a</sup> Likewise *Dio* informs us, that *Octavius* promised the *Veterane* souldiers  $\overline{15}$ . *drachma* a man: whereas <sup>b</sup> *Cicero* expressing the same thing to *Atticus* terms them  $\overline{15}$ . *denarii*. And *Suetonius* writes that *Cesar* by Testament gave to each of the common people *sestertia trecenta*, that is,  $\overline{LXXV}$ . *denarios*, which <sup>c</sup> *Plutarch* both in the life of *Brutus*, and of *Antonius*, renders  $\delta\rho\alpha\chi\mu\acute{\alpha}\varsigma\ \epsilon\beta\delta\omicron\mu\acute{\iota}\kappa\omicron\nu\omicron\tau\alpha\ \pi\acute{\epsilon}\nu\tau\epsilon$  *seventy five drachmes*. In like manner we may say, that *Festus*, and *Fannius*, have described the *amphora* by the Romane foot; not as if this were the exact measure of it, but as being the most known, and neereſt proportion, in which, without falling into fractions, it might evenly, and roundly be expressed.

<sup>a</sup> *Dio* lib. 45. in *Cesare Octav.*

<sup>b</sup> *Cicero* lib. 16. 5. ep. ad *Ani-*  
*cum*.

<sup>c</sup> *Plut.* in *Bruto*. *Idem* in *Antonio*.

And thus have we finished our inquiry after the Romane foot: our next labour should be to



to compare it with the present Standards, and  
Originals, for measures of divers Nations. For  
which I must refer the Reader to this insuing  
Table.

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D 4

The

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## SEMIPIES-ROM

The Romane foot compared with the measures  
of divers Nations.

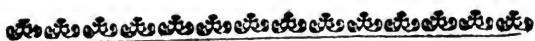
Such parts, as the Romane foot, or that on the monument of <i>Cossutius</i> in <i>Rome</i> , contains —	1000
The foot on the monument of <i>Statilius</i> in <i>Rome</i> , contains —	1005 <sup>17</sup> / <sub>100</sub>
The foot of <i>Villalpandus</i> , deduced from the <i>Congius</i> of <i>Vespasian</i> , contains —	1019 <sup>65</sup> / <sub>100</sub>
The ancient Greek foot, being in proportion to the ancient Roman foot, as XXV to XXIV, contains —	1041 <sup>67</sup> / <sub>100</sub>
The English foot —	1034 <sup>13</sup> / <sub>100</sub>
The Paris foot —	1104 <sup>45</sup> / <sub>100</sub>
The Venetian foot —	1201 <sup>85</sup> / <sub>100</sub>
The Rhinland foot, or that of <i>Snellius</i> —	1062 <sup>25</sup> / <sub>100</sub>
The Derah, or cubit, at <i>Cairo</i> in <i>Agypt</i> —	1886 <sup>25</sup> / <sub>100</sub>
The Persian arish —	3306 <sup>10</sup> / <sub>100</sub>
The greater Turkish pike at <i>Constantinople</i> —	2275 <sup>08</sup> / <sub>100</sub>
The lesser Turkish pike at <i>Constantinople</i> , is in proportion to the greater, as 31 to 32 —	
The braccio at <i>Florence</i> —	1978 <sup>28</sup> / <sub>100</sub>
The braccio for wollen at <i>Siena</i> —	1284 <sup>18</sup> / <sub>100</sub>
The braccio for linnen at <i>Siena</i> —	2041 <sup>17</sup> / <sub>100</sub>
The braccio at <i>Naples</i> —	2171 <sup>65</sup> / <sub>100</sub>
The canna at <i>Naples</i> —	7114 <sup>72</sup> / <sub>100</sub>
The vara at <i>Almaria</i> and at <i>Gibraltar</i> in <i>Spain</i> —	2854 <sup>12</sup> / <sub>100</sub>
Il palmo di <i>Architetti</i> at <i>Rome</i> , whereof X make the canna di <i>Architetti</i> —	756 <sup>98</sup> / <sub>100</sub>
Il palmo del braccio di <i>Mercantia</i> , & di <i>Tessito di Tela</i> at <i>Rome</i> ; this and the former are both ingraven in a white marble stone in the Capitol with this inscription. <i>Curante Lu. Patro</i> —	719 <sup>24</sup> / <sub>100</sub>
The <i>Genoa</i> palm —	842 <sup>81</sup> / <sub>100</sub>
The <i>Amwerp</i> ell —	2360 <sup>21</sup> / <sub>100</sub>
The <i>Amsterdam</i> ell —	2345 <sup>40</sup> / <sub>100</sub>
The <i>Leyden</i> ell —	2337 <sup>13</sup> / <sub>100</sub>

*The English foot taken from the iron Standard  
at Guild-hall in London, and compared  
With the Standards for measures of  
divers Nations.*

Such parts as the English foot contains ———	1000
The Romane foot, or that on the monument of <i>Cossutius</i> in <i>Rome</i> , contains ———	967
The foot on the monument of <i>Statilius</i> in <i>Rome</i> , contains ———	972
The foot of <i>Villalpandus</i> , deduced from the <i>Congius</i> of <i>Vespasian</i> , contains ———	986
The Greek foot ———	1007 $\frac{1}{2}$
The Paris foot ———	1068
The Venerian foot ———	1162
The Rhinland foot, or that of <i>Snellius</i> ———	1033
The Derah, or cubit, at <i>Cairo</i> in <i>Egypt</i> ———	1824
The Persian arish ———	3197
The greater Turkish pike at <i>Constantinople</i> ———	2200
The lesser Turkish pike at <i>Constantinople</i> is in pro- portion to the greater, as 31 to 32 ———	7232
The braccio at <i>Florence</i> ———	1913
The braccio for wollen at <i>Siena</i> ———	1242
The braccio for linnen at <i>Siena</i> ———	1974
The braccio at <i>Naples</i> ———	2100
The canna at <i>Naples</i> ———	6880
The vara at <i>Almaria</i> &c at <i>Gibraltar</i> in <i>Spain</i> ———	2760
Il palmo di <i>Architetti</i> at <i>Rome</i> , whereof X make the canna di <i>Architetti</i> ———	732
Il palmo del braccio di <i>Mercantia</i> , & di <i>Tessito</i> di <i>Tela</i> at <i>Rome</i> : this and the former are both in- graven in a white marble stone in the Capitol with this inscription <i>Curante Lu. Peto</i> ———	695 $\frac{1}{2}$
The <i>Genoa</i> palm ———	815 $\frac{1}{2}$
The <i>Antwerp</i> ell ———	2283
The <i>Amsterdam</i> ell ———	2268
The <i>Leyden</i> ell ———	2260

*This Table I made by the Standards, the former  
by proportion,*

OF



## OF THE DENARIUS.



I have made for measures the Romane foot, the foundation of my inquiry, and therefore have handled it in the precedent Treatise: so for finding out of weights, I shal take the *denarius* as an undeniable principle, from whence those of the ancients by a necessary consequence may be inferred. For as the unity is in respect of numbers, or the *sestertius* in discourses *de re nummariâ*: so is the *denarius* for weights, a fit rule, or beginning, from whence the rest may be deduced. Not but that it were better (as I gave the caution before) if we absolutely consider the exactest waies of discovering weights, to begin vvith the greater, and by them to find out the lesse, then by the lesse, to produce the greater; but if we look upon the condition of times, and consider the means that are left after so many revolutions, and changes of the Romane Empire, it will be safer to alter our method. For to this day there are many thousand *denarii* left, and amongst these some so perfect, and intire, as if they had been but newly brought from the mint, whereas of the Romane *libra*, and ounces, there are but few extant, if compared vvith these. *Lipinus*, and *Gruterus* in their inscriptions mention some, and *Patus* some others, besides such as I have seen in the hands of Antiquaries, and many of mine own: most of which differ from one another, either as having been consumed  
by

by rust, and time, or it may be also by the men that then lived, for their advantage lessened : a thing too often practised amongst us. Wherefore I think it more convenient by the *denarius* to deduce the proof, and evidence of these, then by the diversity, and uncertainty of these to conclude the *denarius* : And yet if some of the best, and fairest of them, shall agree with this, I shall think my self so much the more assured,

Now seeing the *denarius* may be considered in a double respect, either as *nummus*, or as *pondus*: in the first acception, the valuation of it in civill affairs is remarkable, in the later, the gravity, and ponderousnesse : I shall speak no farther of the former, then as it may conduce in some sort to illustrate the later. The *denarius* was a silver coin in use amongst the Romanes, passing at the first institution for *dena ara*, or ten *asses*.

And so <sup>a</sup> *Vitruvius* expressly writes, *Nostri autem primò decem fecerunt antiquum numerum, & in denario denos areos asses constituerunt.* The same

<sup>a</sup> *Vitruv. l. 3. c. 1.*

thing is attested by <sup>b</sup> *Volusius Metianus*. *Denarius primò asses decem valebat, unde & nomen traxit.* <sup>c</sup> *Pliny*, besides a confirmation of the

<sup>b</sup> *Vol. Metianus de assis distributione.*

same valuation, assigns also the time, in which it was first stamped. *Argentum signatum est an-*

<sup>c</sup> *Plinius l. 33. c. 3.*

*no Urbis* \* *quingentesimo octogesimo quinto, Q. Fabio consule, quinque annis ante primum bellum Punicum, & placuit denarius pro decem libris aris:* that is, for ten *asses*. For the *asses* both then, and under the first Consuls were *librales*. *Dionysius Ha-*

<sup>\*</sup> *Budeus l. v de asse, corrects these numbers by Livy (l. xxx) and reads them 478.*

*licarnassens.* <sup>2</sup> *Ἡν δὲ ἀσάδειον, χαλκίον νόμισμα, βάρος ἀσπείον.* The *assis* was a brasse coine, weighing a pound. Where by the way it is worth the obser-

vation,

vation, the strange, and in mine opinion, the unadvised proportion, betwixt the brasse, and silvermonies, of those times; that  $\overline{\text{X}}$ . pounds of brasse should be but answerable to the 84<sup>th</sup> part (for so much, or neer it, was the *denarius*) of a pound of silver; or to speak more cleerly, that one pound in silver should be equall in valuation to 840 pounds in brasse. Neither can there be any excuse of that errour, unlesse this, that there then was an infinite plenty of the one, and as great a scarcity of the other. However it were, the same proportion is testified by *Varro*, who farther addes; that the Romanes took the first use, and invention of the *denarius*, from the *Sicilians*. <sup>d</sup> *In argento nummi, id à Siculis; denarii quòd denos aris valebant.* And according to this valuation the *denarius* had an impresse upon it of the figure  $\overline{\text{X}}$ , denoting the *decussis*, or number of the *asses*, as *Valerius Probus* witnesses, and sometimes this character  $\times$ ; both vvhich I have seen, and can shew, in severall ancient ones. This later by the ignorance of Scribes formerly in *MSS.* and of our Printers of late in the edition of *Celsus*, and of *Scribonius Largus*, is represented by an asterisc  $*$ ; and by a worse errour in the same authors, the figure  $\overline{\text{X}}$  expressing the *denarius*, as a *pondus*, is confounded with the figure  $\times$  expressing a number. From this figure on the *denarius*, or *decussis*, <sup>e</sup> *Vitruvius* calls the intersections of lines, *decusses*, and *decussationes*. And <sup>f</sup> *Columella* useth the phrase *in stellam decussari*, when lines meet diamond-wise, or lozenge-like, as these in the character  $\overline{\text{X}}$  or  $\times$ . Neither did the *denarius*

<sup>d</sup> *Varro l. 4. de Ling. Lat.*

<sup>e</sup> *Vitruv. l. 10.*

<sup>f</sup> *Columella l. 5.*

*denarius* long passe at the valuation of  $\overline{\text{X}}$ . *asses*, nor the *asses* which before, and then were *librales*, continue at one stay, but with the exigencies of the Romane State, the rate of the *denarius* rose, and the weight of the *asses* fell; that is in effect, both the silver, and the brasse monies, came to be augmented in their estimation. For by a publick edict of *Fabius Maximus* the Dictator, the Common-wealth being hardly pressed upon by *Hannibal*, the *denarius* came to be priced at  $\overline{\text{XVI}}$ . *asses*, and the *asses* which were then *sextantarii*, or the sixth part of the Romane pound, (for in the first Punick war, by reason of the excessive expenses of the State, they first fell from being *librales*, to be *sextantarii*.) came now in the second Punick war to be *unciales*. The whole progresse, and manner of this alteration, is by none so well, and fully exprest as by <sup>s</sup> *Pliny*, and therefore I shall a litle insist upon his words. *Silver*, saies he, came to be coined in the 585<sup>th</sup> year of the City, *Q. Fabius* being Consul, five years before the first Punick war, and then the *denarius* passed for  $\overline{\text{X}}$ . pounds of brasse, the *Quinarius* for five, the *sestertius* for two pounds and an half. The weight of the *assis* in brasse was diminished in the first Punick war, the Common-wealth not being able to support the expenses, and then it was decreed that the *asses* should be coined *sextantario pondere*; that is, with the weight of the sixth part of a pound, or two ounces, whereas before they were *librales*. Though *Alciatus* here upon a very grosse mistake contends that they were then coined *dextantario pondere*, and not *sextantario*, but yet that they

<sup>s</sup> *Argentum signatum est Anno Urbis 101xxxv.*

*Q. Fabio Cos. quinque annis*

*ante primum bellum Punick.*

*Et placuit denarius pro X*

*libris æris, quinarius pro quin-*

*que, sestertium pro dupondio,*

*ac semisse. Li-*

*bra autem pondus æris immi-*

*nutum bello Punico primo,*

*cum impensis Resp. non suffi-*

*ceret, constitutumque ut asses*

*sextantario pondere ferirentur. Plin lib.*

*33. c. 3.*

were

<sup>h</sup> Sext. Pompei-  
us Fest. de verb.  
fig.

<sup>i</sup> Plin. l. 33 c. 3.  
Ita quinque  
partes factæ lu-  
cri dissolutum-  
que æs alienum.

<sup>k</sup> Agricola lib. 2  
de pondere &  
temporat. mone-  
tarum.

<sup>l</sup> Villalp. de  
appar. urbis ac  
templi par. 2.  
l. 2. disp. cap. 9.

<sup>m</sup> Postea Hanni-  
bale urgente, Q.  
Fabio Maximo  
Dictatore, asses  
unciales facti;  
placuitque de-  
narium XVI.  
assibus permutari,  
quinarium octonis sester-  
tium quaternis:  
Ita Res. dimi-  
dit lucrata est.  
In militari ta-  
stipendio

were called *asses sextantarii*, because the *sextans* or sixth part of an ounce was wanting: where-  
as <sup>h</sup> *Festus* expressly writes. *Grave æ dictum à pondere, quia deni asses singuli pondo libra efficiebant denarium ab hoc ipso numero dictum; sed bello Punico populus Romanus pressus æ alieno, ex singulis assibus libralibus senos fecit, qui tantundem valerent.* And these words of *Pliny*, which immediately follow those before recited, put it out of controversie. <sup>i</sup> *Whereby*, saies he, five parts were gained, & the debts (of the Commonwealth) discharged. I would gladly see by what Arithmetick *Alciatus* can demonstrate, that the Common-wealth shall gain five parts, making the *asses sextantarii* in his sense; whereas on the contrary, taking them in this interpretation (as both <sup>k</sup> *Agricola*, and <sup>l</sup> *Villalpandus* doe) it is a thing most evident. For the whole pound, or *assis*, before consisting of XII. ounces, being now reduced to two ounces, and these two passing at as high a rate in the valuation of things vendible, as the vvhole *libra* did, it is plain that the Common-wealth by this diminution of weight, keeping the same constant tenure of the estimation of the *assis*, gained ten parts in twelve, that is, five in sixe; and not one in six, as *Alciatus* would have it. But to omit this digression, and to return to <sup>m</sup> *Pliny*. Afterwards being oppressed by Hannibal, under Q. Fabius Maximus the Dictator, the asses were made unciales, and the denarius passed for XVI. asses, the *quinarus* for VIII. and the *sestertius* for IIII. And hereby the Common-wealth gained half, yet in the pay of the Militia the denarius was alwaies ac-



accounted for ten asses. The impresse of the *semper denarius* silver [that is, of the denarius] were the biga, and quadriga; from whence they are called bigati, and quadrigati. Not long after by the *lex Papiria* the asses came to be *semunciales*. *Livius Drusus* Tribune of the people mixed an eighth part of brasse with the silver: thus far *Pliny*. Out of which vvords it is most evident (omitting many passages of his, worth our consideration) that as the *denarius* at the first institution passed for ten asses, so afterwards it vvas valued at XVI. And *Vitruvius* gives a reason why next to ten, they made choice of XVI. rather then of XII. or any other proportion. <sup>n</sup> *Quoniam animadverterunt utrosque numeros esse perfectos, & sex, & decem, utrosque in unum conjecerunt, & fecerunt perfectissimum decussissexi*, where <sup>o</sup> *Budens* reads *decussissexis*: but *P. Villalpandus* decussissex, that it may the better, as he imagines, answer to the Greek *ἑξάξξ*. <sup>q</sup> *Hujus autem rei, faith Vitruvius, autorem invenerunt pedem. E cubito enim cum dempti sint palmi duo, relinquitur pes quatuor palmorum, palmus autem habet quatuor digitos, ita efficitur uti pes habeat sexdecim digitos, & totidem asses aureos denarius.* <sup>r</sup> *Metianus* also purposely treating of this argument, after that he had related that the *denarius*, at the first institution, was valued at ten asses, adds now it is worth sixteen. And not to cite more authorities, the impresse or stamp of XVI, as well as of X found upon several *denarii*, and seen both by <sup>r</sup> *Antonius Augustinus* (a man very accurate in coins, as appears by his dialogues) and by *Villalpandus*, besides one with the inscription

*pro X assibus  
datus. Nota  
argenti fuere  
biga atque qua-  
drige, & inde  
bigati, quadri-  
gatique dicti.  
Mox lege Papi-  
ria semuncia-  
les asses facti.  
Livius Drusus  
in Tribunatu  
plebis octavam  
partem aeris ar-  
gento miscuit.  
Plin. l. 33. c. 3.  
Vitruv. l. 3. c. 1.*

<sup>o</sup> *Budens l. 5.  
de asse.  
P Villalp. de  
apparatu Urbis  
ac Templi.  
Vitruv. l. 3. c. 1.*



<sup>r</sup> *Vol. Metianus  
de assis distrib.*

<sup>r</sup> *Anton. August.  
dialogo. 1.*

inscription of *C. Titinius*, with the same character, mentioned by *Fulvius Vrsinus*, and *Dalechampi* in *Plin. l. 33. c. 3* puts it out of controversie. And this valuation of the *denarius*, as it is more then probable, continued from the first institution of it in the second Punick war, without any interruption, to *Justinians* time, and it is likely longer; since there is no proof out of any ancient Author, nor any character on any ancient *denarius*, found to the contrary. As for those authorities, which are alleaged, and pressed by *Budens*, and *Alciatus*, of *Varro*, *Apuleius*, *Arruntius*, and *Pompeius*, affirming, that after the second Punick war, the *denarius* contained ten *asses*, the *Quinarius*, or *Victoriat* five, the *sestertius* two and an half: we may give a true, and easie solution, that these Writers expressed the valuation of them, as they were in their first originall, and beginning; with reflection to their primitive denomination: in which respect the *Treviri monetales*, or officers of the mint, usually imprinted on the *denarius* the character X, rather then XVI, the former being the impress of its first institution, and the latter of its after valuation. And so in like manner may those citations be answered of *Plutarch*, *Dionysius*, and others, produced by some learned men to strengthen their assertion, that the *denarius* after the second Punick warre returned to its first estimation. Which thing could not have been effected, without extreme losse, and prejudice to particular men, in their private fortunes, and estates; which the justice, and wisdom of the Romane Senate, under the Consuls, was not likely to have

in-

introduced, or the people to have admitted.

To conclude, the *denarius*, as it is evident by many irrefragable authorities before alleaged, in the highest valuation passed for sixteen *asses*, and according to that proportion the *quinarius*, or *Victoriatus* for eight, the *sestertius* for four: but in the lowest valuation, or first institution, it passed for ten *asses*: and then the proportion of the *quinarius* was five: of the *sestertius* two *asses* and an half, and therefore was thus marked IIS, or thus HS, as the *Quinarius* had this character, V. and also this X, as it is to be seen in a *Victoriatus* of mine own (besides several others) with the face & inscription of *M. Cato*. By which coin that place may not unfirly be explained, which troubled \* *Budens*, why the \* *Budens li. i.*  
*Ordo decussatus*, and *ordo quincuncialis*, signifie in *de asse*,  
the ranking of trees the same thing, although the *quinarius*, or *quincunx*, give the denomination to the one, & the *denarius*, or *decussis*, to the other. The reason is, because the *Quinarius* had the character X imprinted on it, as well as the *denarius*, or *decussis*. Besides in *Temporarius*, *porarii*,  
we finde the *quincunx* to bee thus  represented, as the *uncia* thus  so that five of these *uncia* making the *quincunx*, and these five being ranged like the figure X (the character of the *decussis*) it is no wonder if the *ordo decussatus*, and *quincuncialis*, were taken for the same.

That the *denarius* should have passed at any other rate between  $\overline{\text{XVI}}$ , and  $\overline{\text{X}}$  *asses*, as there is no coin extant to prove it, so there is no expresse authority to conclude it. Though some

E

infes

<sup>a</sup> Polyb. l. 2.

infer out of <sup>a</sup> Polybins, that it was valued also at XII. asses: because he defines the *ἡμισσίδιον*, or *semissis*, to be τέταρτον μέρος ὀβολῷ, the fourth part of the Attick obolus; and six oboli being in the δραχμή, to which drachma they suppose the denarius equall, therefore there must be XXIV. semisses, or XII. asses in the denarius. But with much better reason we may hence infer, that the drachma was somewhat bigger, then the denarius, as we shall prove in this ensuing discourse; and therefore Polybins allows XII. asses to it: whereas, if it had been precisely equall to the denarius, he would have valued it at X, or else XVI. of the lesser sort of asses. So that Sir H. Savile, a man of exquisite judgment, and learning, in his discourse at the end of Tacitus, justly blames Hottoman for altering the text of Polybins, and is himself to be censured, as also <sup>a</sup> Lipsius, in inferring thence that the denarius contained XII. asses.

<sup>a</sup> Lipsius Ele-  
gor. 1. c. 2.

The severall parts of the denarius, excepting the *quinarius*, and *sestertius*, of both which I have spoken before, are all comprized in this description of <sup>b</sup> Varro, with which I shall conclude. *Nummi denarii decima libella, quod libram pondo as valebat, & erat ex argento parva; sembella quod sit libella dimidium quod semis assis. Teruncius a tribus uncis sembella quod valet dimidium, & est quarta pars sicut quadrans assis.* By which proportions it appears, that the *libella* was the X<sup>th</sup> part of the denarius, when it vvas currant at ten asses, the *sembella* the XX<sup>th</sup>, the *teruncius* the XL<sup>th</sup>. And thus much of the denarius as it is *nummus*.

<sup>b</sup> Varro lib. 4.  
de Ling. Lat.

The

The second, and our principall consideration of the *denarius* is as it is *pondus*. In which acceptation it will be necessary to præmise a second distinction; that the *denarius* was either \* *Consularis*, or *Cæsareus*. The *Consularis* was that which was made under the government of the City by the Consuls, [the *Cæsareus* under the Cæsars: The *Consularis*, (I mean the *Consularis* after the second Punick war; and under the later Consuls) contained precisely the seventh part of the Romane ounce, as the other did the eighth part, or somewhat neerer it.]

First, that the *denarius Consularis* of the later Consuls, was the seventh part of the Romane ounce: this shall be our principall inquiry, because it is more evident of the two, and will give us the best light to discover the true weight of the *denarius*; in the notion, and acceptation of the ancients, both Greeks and Latines. It is most apparent both by severall fair coins, which I have perused of the later Consuls, as also by *Cornelius Celsus*, who lived in the beginning of the Romane Emperors,

\* The *Consularis* again may be considered either in the time of the former, or of the later Consuls; that of the former Consuls, at the first institution of it by *Q. Fabius* five years before the first Punick war, *Peireskians* not improbably imagines to have been the sixth part of the Romane ounce: and *Agricola* by comparing it with the *talentum Atticum*, which

*Varro* values at 15000. *sestertii*, and with the *tetradrachme*, which *Livy* (*lib.* 34.) estimates *trium fere denariorum*, as also upon the authority of the *Scholiast of Nicander*, who equals the *denarius* to a drachme and an half, as *Priscian* doth to a drachme and a third part, I say *Agricola* assigns to it almost the same proportion with *Peireskians*. But because I have seen no *denarii Consulares* of so great antiquity; and these authorities may perchance admit of other constructions, I shall leave this opinion as onely probable, and follow what is more certain, and demonstrative, of the later Consuls.

E 2

before

before there happened a generall diminution of the *denarius*, that it was then the seventh part of the ounce, who thus writes, <sup>c</sup> *Sed & antea*

<sup>a</sup> *Celsus lib. 5. c.* *sciri volo in uncia pondus denariorum esse septem.*

17.

<sup>d</sup> *Scrib. Largus*  
*in præfatione.*

The same proportion is also expressed by <sup>d</sup> *Scribonius Largus*, who lived not long after *Celsus*, as some imagine, his words are these. *Erit autem nota denarii unius pro Gracâ drachmâ; æquæ enim in librâ denarii octoginta quatuor apud nos, quot drachmæ apud Græcos incurrunt.* <sup>e</sup> *Pliny* also

<sup>e</sup> *Plinius l. 33.*  
69.

confirms the same. *Miscuit denario triumvir Antonius ferrum, alii* (he means under the Emperours) *è pondere subtrahunt, cum sit justum octoginta quatuor è libris signari.* Out of vvhich vvords of his, and of *Scribonius Largus*, it will by a necessary consequence be inferred, that the true weight of the *denarius Consularis* is the seventh part of an ounce. For if we multiply twelve the number of the ounces in the *Romane libra* (as by all it is confest) by seven the number of the *denarii*, of which the ounce then consisted, the sum will be *LXXXIII. denarii*; and so many, say *Scribonius*, and *Pliny*, ought justly to be in the *Romane pound*. And these are the onely cleer, and positive authorities that are to be found in *Classicall Authours*; most of the writings of the *Ancients de ponderibus & mensuris*, having long since been lost; or else those few fragments that are left, of *Cleopatra*, *Dioscorides*, and of others, are so corrupted, that little truth with any certainty can be collected. From whence it will by way of corollary follow, that if either the *denarius Consularis* be given, the *Romane*

mane ounce, and *libra*, in the same proportion will necessarily be thence deduced; or if the Romane ounce, and *libra* be given, the *denarius* will as necessarily be concluded.

But before we farther treat of this argument, we shall indeavour also to demonstrate the *denarius*, by the *drachma Attica*. For *Scribonius* seems, and so doe other ancients, to make them equall. And therefore *Pliny* writes: <sup>f</sup> *Drachma* <sup>f</sup> *Plinius li. 21.* *Attica denarii argentei habet pondus:* whereas <sup>ca. 34.</sup> the *drachma Ægina* was much larger, this containing *X.* such *oboli* as the Attick contained *VI.* and therefore the *Athenians* in hatred of the *Ægineans* called it *παχίαν δραχμήν*, as <sup>g</sup> *Pollux* testifies. And here as we considered the *denarius*, as *nummus*, and as *pondus*; so likewise must we take the *drachma Attica*, as *nummus*, and as *pondus*: in the prosecution of both vvhich relatively to the *denarius*, I shall insist so much the longer, because it is an argument that hath scarce at all, or very perfunctorily been handled. The *drachma* as *nummus*, was a silver coin in use amongst the *Athenians*, (for I intend only to speak of the *drachma Attica*, for the same reason that <sup>h</sup> *Pliny* doth. *Ferè enim Atticâ observatione utuntur medici*) and so it was the measure of things vendible, as all coins are: and as *pondus*, so was it the measure of their gravity, & weight. Now the *drachma*, as *nummus*, passed in the estimation of the best Authors, both Greek and Latine, at the same rate, and valuation as the *denarius* did. And therefore, as often as the Latines are to expresse the Greek *drachma*, they render it by the *denarius*, and on the contrary, the Greeks the *denari-*

<sup>g</sup> *Inl Poll. l. 9.*  
<sup>c. 6.</sup>

<sup>h</sup> *Plinius l. 21.*  
<sup>ca. 34.</sup>

<sup>i</sup> Ciccr. 16. l. 5.  
ep. ad Attic.

<sup>k</sup> Dio lib. 45.  
<sup>l</sup> Plinius lib. 8.  
cap. 57.

Hesychius in  
voce δινάριον.

<sup>m</sup> Valer: Max:  
lib. 6. cap. 6.  
<sup>n</sup> Strabo li. 5.  
Geogr:

• Fragmenta  
Cleopatrae.

\* A. Gellius  
l. 1. c. 8. Noft.  
Att.

us by the *drachma*. Thus vvhhat <sup>i</sup> Tully renders by the *denarius*, Dio in his 45<sup>th</sup> book expresseth by the *drachma*. Their words, both speaking of *Augustus*, are these, *Veteranos quique Castilini, & Calatie sunt* (as Tully relates) *perduxit ad suam sententiam, nec mirum, quingenos denarios dat.* Καὶ ἔδωκεν εὐδὺς τότε, saith <sup>k</sup> Dio, καὶ πενταχοσίας δεαχμίδς. In like manner <sup>l</sup> Pliny writes, *venisse murem ducentis nummis*, (that is, *denarius*; for *nummus* absolutely put is often, though not alwaies, taken for the *denarius*, as on the contrary the *denarius* is taken for *nummus* in Hesychius, \* δινάριον τὸ νόμισμα, ἢ ἔδος ἀργυρίου.) *Castilinum obsidente Annibale, eumque qui vendiderat fame interisse, emptorem vixisse annales tradunt.* The same thing <sup>m</sup> Valerius Maximus reports in his 7<sup>th</sup> book, and 6<sup>th</sup> ch. and <sup>n</sup> Strabo in his 5<sup>th</sup> book; the former writing that it was sold for 200 *denarii*, and the later that it vvas bought for 200 *drachma*. To these Authorities I shall adjoin <sup>o</sup> Cleopatra. Τὸ Ἰταλικὸν δινάριον ἔχει δεαχμὴν ἃ. The Italian *denarius* containeth one *drachma*: and \* A. Gellius, *Lais μυρίας δεαχμίδς ἢ πέντατον ποπόσκει, hoc facit nummi nostratis, denarium decem millia.*

These two thus passing the one for the other, being also at the first institution much of the same fineness in respect of silver, it must necessarily be admitted, either that they were exactly the same for weight, vvhich is our next inquiry, or else that they vvere not much different. For in comparing of forain coins, the κομμβισαί, or *nummularii*, in ancient times, must have taken the same course, which our most knowing bankers



kers doe practise now. First, to respect the purenesse, and finenesse of the coins, whither they be alike *for the intrinseck*; and next, whither they have the same weight; and if they differ in either, or both of these, according to those differences to proportion their exchanges. Those other accidentall causes of the rising, and falling, of exchanges of monies, since they are meerly contingent, depending upon the necessities, either of times, or places, or persons, I purposely pretermit, as not so proper, and essentiall to our inquiry. As *for the extrinseck of coins*, by which I mean the outward form, or character, and inscription of the Prince, or State, though this may raise the valuation of them in those Countries, which are subject to the Prince, or State, and lessen them in those which are out of their dominions; yet this can produce no remarkable difference, more then what is usually assigned by the Masters of the Mint, for the wast in coining, and for the labour of the vwork.

With these cautions if we shall examine the Attick *drachma*, and by such writings of the Ancients, or by such coins as are extant, inquire their true weight, we shall come to such a preciseness; as may be hoped for in a work of this nature. P *Suidas* tells us in the generall, *δραχμή* ὅλην νομισματοῦ ἀργυρίου. *The drachma is the weight of the silver money.* And *Hesychius* more particularly informs us. *Δραχμή τὸ ὄγδοον τῆ ὀνκε*, *The drachma is the eighth part of the ounce;* and *Fannius* yet more distinctly writes, *Ῥηέννα. Fann.*

*In scrupulis ternis drachmam, quo pondere doctis  
Argentifacilis signatur pondus Athenis.*

<sup>1</sup>Fragmenta  
Cleopatrae.

To which vve may adde <sup>1</sup>Cleopatra, Ἡ Δραχμή  
ἔχει ῥηθιμματα γ'. ὀβολὺς ε'. δειμὺς θ'. κρηπια ἡ.  
χαλκὺς μῆ. The drachme hath three scruples, fixe  
oboli, nine lupini, eighteen siliqua, forty eight are-  
ola. The <sup>1</sup>Scholiast of Nicander also makes the

<sup>2</sup>Scholiastes  
Nicandri.

διδραχμὸν to be τὸ τέταρτον τ' ὕψιας, the fourth  
part of the [Attick] ounce. In the same propor-  
tion are we to take those other silver Athenian

<sup>3</sup>Iul. Poll. l. 9.  
c. 6.

coins mentioned by <sup>3</sup>Iulius Pollux, namely, the  
τρίδραχμον, which consisted of three drach-  
mes, the τετράδραχμον, or τέτραχμον, which

<sup>4</sup>Hesychius in  
voce τέτραχ-  
μα.

by a Syncope, is the same with the τετρά-  
δραχμον, containing foure drachmes, or the  
half ounce. Τέτραχμον, τετράδραχμον, saith <sup>4</sup>He-

<sup>5</sup>Ammonius  
περὶ ὁμοίων καὶ  
διαφορῶν λέξε-  
ων.

sychius; though <sup>5</sup>Ammonius puts a distinction  
between them, τέτραχμον μὲν ῥῶσται τὸ νόμισμα,

<sup>6</sup>Fragmenta  
Cleopatrae.

τετράδραχμον δὲ τῶν τεσσάρων δραχμῶν [ἀξιον]. This  
the Greeks also called σατήρ, as <sup>6</sup>Cleopatra, and

<sup>7</sup>Epiphanius  
περὶ σταθμῶν.

<sup>7</sup>Epiphanius witnesse. Ὁ σατήρ, in Cleopatra,  
ἀγχι ϙ' δ'. καλῶν δὲ αὐτὸν τετράδραχμον: the stater  
weighs four drachmes; this they call the tetra-  
drachme. And this also may most cleerly be

<sup>8</sup>Matth. ca. 17.  
v. 24.

collected out of <sup>8</sup>S. Matthew, where seeing the  
original expresseth it more fully then our tran-  
slation, I shall recite the vvords as they are in the

Greek. Ἐλθόντων δὲ αὐτῶν εἰς Καπρναὺμ, προσήλθον  
εἰ τὰ διδραχμα λαμβάνοντες τῷ Πέτρῳ, καὶ εἶπον,  
ὁ διδάσκαλ' ὑμῶν ἐτελεῖ τὰ διδραχμα; which  
the Vulgar renders thus, Et cum venissent Caper-  
naum, acceperunt, qui didrachma accipiebant, ad  
Petrum, & dixerunt ei, Magister vester non sol-  
vit didrachma? and our Translation thus, And  
when

when they were come to Capernaum, they that received tribute money, came to Peter, and said, Doth not your Master pay tribute? In the 27<sup>th</sup> verse of the same chapter, our Saviour answers.

ἵνα μὴ σκανδαλίζωμεν αὐτοὺς, πορεύεις εἰς τὴ θάλασσαν βάλε ἄγκιστρον, καὶ τὰ ἀναβαίνοντα πρῶτον ἰχθύν ἄρον, καὶ ἀνοίξας τὸ στόμα αὐτοῦ, εὐρήσεις σάπην. ἐκείνον λαβὼν δίδς αὐτοῖς ἀντὶ ἐμοῦ καὶ σοῦ. Notwithstanding, lest we should offend them goe thou to the sea, and cast an hook, and take up the fish that first cometh up: and when thou hast opened his mouth, thou shalt find a peece of money: that take, and give unto them for me, and thee. This, which our Translation calls tribute money, in the 24<sup>th</sup> ver. is called in the originall δίδραχμον, or two drachmes, & so much was paid by the pole, according to <sup>d</sup> Josephus, for each particular person. Our Saviour therefore paying for himself and S. Peter, in the 27<sup>th</sup> verse, bids him to give a stater, that is, a τετραδράχμον, or four drachmes, namely, the double to the δίδραχμον, which our Translatiō renders too generally by a peece of money: But the <sup>e</sup> Persian Translation interprets it distinctly by four drachmes.

<sup>d</sup> Josephus li. 7.  
bell. Ind. ca. 27

<sup>e</sup> Evangelia  
Pers. MSS. E-  
ruditissimi Viri  
D. Pocockii.

چهار درم سرو بیای انرا بیاور  
عوض من و عوض تو بد  
Thou shalt finde four drachmes in it, that take, and give for thee, and me.

With this Attick tetradrachme, or silver stater, the Hebrew, and Samaritane שֶׁקֶל shekell, that is, sicle, did also agree. For if we give credit to Josephus, who in <sup>f</sup> Scaligers esteem is, Diligentissimus καὶ φιλαληθέστατος omnium scriptorū, we shall finde them to be the same. καὶ ὁ ὁ νόμος νόμισμα

<sup>f</sup> Scal. de Rele-  
γομ. in libr. de  
Emend. Temp.  
<sup>g</sup> Josephus l. 3.  
antiq. Judae.

ἰσραήλ

Philo de deca-  
logo.

Hesychius in  
voce σίκλος.

Hieronym. in  
Ezek. 3.

\* Such sicles,  
I conceive,  
were those

ἱσβαίων ἂν Ἀπικὰς δέχεθ' ἀραχμὰς τέσσαρες. *The sicle is a sort of money amongst the Hebrews, that contains four Attick drachmes. The same proportion is evidently collected out of <sup>h</sup> Philo, where for L. shekels mentioned in the Law he renders CC. drachmes, and for XXX. an hundred and twenty. <sup>i</sup> Hesychius likewise testifies as much, σίκλος τετράδραχμον Ἀπικόν, the sicle is [in valuation] the Attick tetradrachme: and <sup>k</sup> S. Hierome, the ablest of the Fathers in the Jewish Antiquities, \* Siclus, id est stater, habet quatuor drachmas Atticas.*

τρίαικοντα ἀργύρια, the XXX peeces of silver, which were given to Judas, as the reward of his treason. Eusebius relating the story expressly, terms them silver staters, which an Hebrew would have termed either silver shekels, or absolutely. שֶׁקֶל cefel: this in the Scripture phrase being frequently put for the shekel, and therefore the Syriack Translation of the New Testament reads it שֶׁקֶל; Whence Tremellius hath this annotation. *Observant Hebraei, ubicunque in Scripturis argenteorum fit mentio, non expressâ numismatis argentei specie, intelligi siclum sanctuarii equivalentem quatuor denariis.* Some modern Writers imagine them to have been but XXX. denarii; But Baronius contends that they were, *vel librarum argenti XXX, vel aureorum coronatorum trecentorum:* And Arias Montanus, that they were either XXX librae, or XXX. talenta. The most probable opinion is, that this sum was neither so great as Baronius, and Montanus make it, nor yet so little as some Moderns would have it, but between both, and that is XXX. shekels. M. Casaubone in his Exercitations upon Baronius hath a probable conjecture to strengthen this assertion. *Non enim temere factum videtur, quod filius Dei qui sese exinavit, assumptâ servi formâ, Phil. 2. 7. triginta argenteis venderetur, sicut lege Dei mancipia totidem siclis aestimantur.* Exod. 21. 32. & apud Iosephum lib. IV. c. VIII. *Facit hoc quoque non parum ad Domini abjectionem declarandum, quando caput ejus tam parvi aestimatum est.* A small price I confesse, XXX. shekels being lesse then XV. of our ordinary crowns: But Hierome upon Saint Matthew thought it to bee as little, who thus writes, as M. Casaubone renders him, *Infelicem Iudam non cogitasse quanti pretii rem venderet: sed Christum mundi Salvatorem, Dei filium, cœu vile aliquod mancipium minimo pretio addixisse.* Now the price of a servant we finde in Exodus to have been XXX. shekels.

These

These testimonies are so positive, and from so good Authors (to which also I might adjoin <sup>1</sup> *Epiphanius* in his book *περὶ καθάρων*, did I not conceive him to be full of errors in that discourse), that I cannot sufficiently wonder at that strange opinion of <sup>m</sup> *Grsepsius*, and some others, introduced out of affectation of novelty, of a double shekel, the one sacred, equall to the tetradrachme, the other prophane, weighing the didrachme: that used in the Sanctuary, this in civill commerce, without any solid foundation in the writ, or without any probability of reason, that in any wise State, the Prince and people should have one sort of coin, and the Priests should have another: and that this of the Sanctuary should be in a double proportion to the other, and yet that both should concur in the same name. It is true there is often mention in the <sup>n</sup> Scriptures of the *weights of the Sanctuary*, not as if these were different from what were used vulgarly in the City; but because the Standards, and originals, the rules of commutative justice, and therefore of an high and sacred use, were kept (as it is more then probable) in the Sanctuary; For God himself makes this one of the Priests offices, *ut sint super omne pondus atq; mensurā*. And it is no wonder that God, who so much hated a *false balance*, and a *false measure*, should commit the charge of these to the Priests, as things most holy; since the Heathens themselves out of a reverent estimation of them, placed them in their temples, as appears by that inscription of the *congrins of Vespasian* before alleaged, and now ex-

<sup>1</sup> *Epiphanius περὶ καθάρων.*

<sup>m</sup> *Grsepsius de multiplici siclo, & talento.*

<sup>a</sup> And all thy estimation shall bee according to the shekel of the Sanctuary.

*Levit. 27. 25. Vet. vulg. siclo Sanctuarii ponderabitur.*

<sup>o</sup> *1 Paral. 23. 29*  
<sup>p</sup> *Prov. 11. 1. item cap. 20. ver. 10. 23.*

tant

† Rhemn: Fann.  
sarmina de  
pond. & men-  
suris.

tant in Rome; and by these verses of 9 Fan-  
nius, treating of the Romane measures,

*Amphora fit cubus, quam, ne violare liceret,  
Sacravere Iovi Tarpeio in monte Quirites.*

And afterwards in the times of Christianity they were kept in Churches, as it is to be seen in the Authenticks of Iustinian; where he commands, that the weights and measures should be kept, in *sacratissimâ cujusvis civitatis ecclesiâ*, As for those allegations taken out of the interpretation of the LXX. whereby Grsepsius, and others goe about to prove a double shekell, they are all well, and solidly, in my judgement, answered by Villalpandus, and others, to whom I shall refer the judicious Reader. For I intend not here to speak of the Hebrew shekel, or Attick drachme, more then what may serve to illustrate the *denarius*.

Seeing therefore, as we have proved, that the Attick *drachma* was equall in the notion, and acception of the Ancients, to the *denarius*: if therefore an intire, either Attick δραχμή, or δίδραχμον, or τετράδραχμον were found, wee might thence conclude the *denarius*. Again, since the Hebrew shekel hath likewise been demonstrated to be equall to the Attick τετράδραχμον, and this Attick τετράδραχμον to four *denarii*, by the common, and received \* axiome of Geometricians, we may conclude, that the Hebrew shekell was also equall to 4 *denarii*, that is, that 4 Romane *denarii*, the Attick τετράδραχμον, and the Hebrew שֶׁקֶל were all respectively equall to one another. If therefore an Hebrew shekel, fair, & intire, were found, we might as necessarily thence

† Authentick.  
collat. 9. de col-  
latoribus tit. 11.  
novel. 128. c. 15

† Villalp. de ap-  
par. urbis ac  
templi par. 2.  
lib. 2. diss. 4. c.  
28. Item par.  
2. li. 2. diss. 4.

\* Quæ eidem.  
equalia, sunt  
equalia inter se.  
Eucl. ax. 1. l. 1.

thence infer the *denarius*, as by the *τετραδραχμων*.

We shall indeavour by both these to inquire out the truth, and first by the Attick tetradrachmes in silver: because of these I have seen, and weighed many, some of them very fair, and perfect, and found at many severall places, as *Athens*, *Constantinople*, *Tenedos*, and other parts: where the art of counterfaiting coins is not as yet crept in, and where it is to litle purpose to practise it: seeing in those places there are few so curious as to buy them, or that will give a greater valuation, then what they are worth in the *intrinseck*. Wherefore having in *Italy*, and elsewhere, perused many 100 *denarii Consulares*, I finde by a frequent, and exact triall, the best of them to amount to *LXII*. grains English, such as I have carefully taken from the Standards of the Troy, or silver weights, kept in the Tower in *London*, and in Goldsmiths Hall, & in the Vniversity of *Oxford*: on the other side weighing many Attick tetradrachmes, with the image of *Pallas* on the fore part, and of the *noctua* on the reverse. I find the best of these to be *CCL XVIII*. grains, that is, each particular drachme *LXVII*. grains.

And that no man may doubt whither these were true *Athenian tetradrachmes*, we are to observe, that the Ancients used severall impresses on their coins, by which they might be known, and distinguished. And therefore *argentum signatum*, in the description of *Quintius* his triumph over *Philip*, is by *Livy* opposed to *argentum infectum*, which *Pollux* terms *δοναρον*, as *Tully* calls the former sort *factum*, atque *signatum*, and the *Greeks* *ἐργαστηριον*. Thus the

<sup>c</sup> *Livius* l. 34.

<sup>u</sup> *Iul. Poll.* l. 9.

c. 6.

<sup>c</sup> *Cicer.* 6. *Verr.*

<sup>u</sup> *Iul. Poll.* l. 9.

c. 6.

<sup>a</sup> Liv. l. 34.

<sup>a</sup> Plinius l. 33.

ca. 3.

<sup>a</sup> Plin. ib.

<sup>b</sup> Plutarchus in  
Artaxerxe.

Τὸ γὰρ Περσικὸν  
νόμισμα τοῦ  
τὴν ὀπίσθιον  
εἶχε.

<sup>a</sup> Plut. Agefil.

<sup>a</sup> Virg. l. 1. A-  
neid.

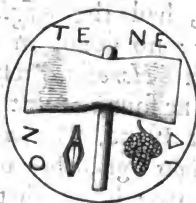
<sup>a</sup> Jul. Poll. l. 9.  
5. 6.

<sup>a</sup> Heraclides  
περὶ πολιτε-  
ῶν.

the *denarius* had the impress of the *biga*, or *quadriga*, as *Pliny* informs us: and therefore <sup>a</sup> *Li-  
vy* uses the word *bigati* for *denarii*. & <sup>a</sup> *Pliny* both  
*bigati* and *quadrigati*. The brasse coins of the Ro-  
manes were thus marked. \* *Nota eris fuit ex alter-  
rà parte Ianus geminus, ex alterà rostrum navis,*  
*in triente vero & quadrante rates.* The *Persi-*  
*ans* stamped on the reverse an <sup>b</sup> archer: vvhich  
occasioned that conceit of *Agefilaus*, mentioned  
by <sup>a</sup> *Plutarch*, that the King of Persia had  
beaten him back with ten thousand archers,  
when with so much mony he had corrupted the  
Grecians. The *Carthaginians* on the one side  
signed the face of a woman, (I suppose in  
memory of Queen *Dido*) on the reverse the  
head of an horse, or in *Virgils* expression \* *ca-  
pit acris equi*, both vvhich I have seen. The  
*Peloponnesians* had the impress of a tortoise on  
their mony, whence that witty Greek proverb  
took its originall. <sup>c</sup> *Τὰν ἀστὴν, καὶ τὰν κορίαν ὡ-  
ρεῖν χαλᾶναι.* The mony at *Tenedos* had on the  
one side a double hatchet, and on the other  
side two heads, one of a man, and another of  
a woman, arising from the same stemme, or neck,  
in memory of a Law made by the King of that  
Island (whom <sup>a</sup> *Heraclides* names *Τέννης*, placing  
him ancienter then the *Trojan* war), that a man,  
and a woman, taken in adultery should have  
their heads struck off vwith an hatchet. In  
which kind I met with two very rare, and an-  
cient coins in silver, at *Constantinople*, both made  
vwith a very fair relevy, and both agreeing in  
the same image, and inscription: the one  
weighed lesse then the *Attick tetradrachme*, the  
other wanted somewhat of the *drachme*. And  
because



because the coin hath not, I think, been seen by any Antiquary, and the history is remarkable. I shall here express the figure of the fairest of these.



And the history I shall relate out of *Heraclides*. *Nóμον δὲ τινά φασι ἢ βασιλῆα Τέννην δια- θέσθαι, εἴπε λαβοὶ μοιχὸν ἀποκτείνην τῷ τῶν παλίν- αλόντος. ὃ τὸ υἱοῦ αὐτοῦ, καὶ τοῦ λαβόντος ἐρομένου ἢ βασιλῆα τί χρὴ ποιεῖν, ἀποκρίνασθαι τῷ νόμῳ χρῆ- σθαι. καὶ δια τοῦτο τοῦ νομίσματος αὐτοῦ ὅτι δάτερα πύλεως κεχάρακται, ὅτι δάτερα ὃ ἕξ ἐνδὲς αὐχένου πρόσωπον ἀνδρὸς καὶ γυναικὸς. καὶ οὕτως λέγει ὅτι ἢ ἀποτρώμων, τὸ ἀποκακόφθαι Τενεδίον πύλεως. They say King Tennes made a law, that if one took another in adultery, he should kill him with an hatchet. His sonne being found so, and he that took him, asking the King what he should do, he answered execute the Law: and for this reason of one side of his money there was an hatchet imprinted, on the other the face of a man, and of a woman, arising out of one neck. From hence is it said of severe actions, to be cut with a Tenedian hatchet. For vvhich exemplary justice those of Tenedos, as it is probable, deified King Tenes. Tully writes, Tenedij Tenem [Denum appellans]: Cicer. lib. 3. and again, Tenem apud Tenedios putant esse san- ctissimum rum.*

*Etissimū Deum, ac eorū Urbem condidisse.* Where his name is truer writ thē in *Heraclides*. For the coin hath onely a single N. and so hath \* *Eustathius*.

*Eustathii πα-  
ρεχόμεναι εἰς  
τὴν ἀράχων.  
Ιλίου.*

\* *Herodot. in  
vita Homeri.*

The mony of *Chios*, as *Iulius Pollux* witnesses, had the effigies, or resemblance, of *Homer*: no doubt in honour of his memory; though *Herodotus* relates, that whilst he vvas living he found at first but cold entertainment in that Island. *Theseus* the tenth King of the *Athenians* signed his mony with the impresse of an oxe; hence that proverb *βοῦς ὅτι γλώσῃ*

\* *Int. Poll. l. 9.  
f. 6.*

*βέβηκεν.* This as *Iulius Pollux* testifies was the *ἀράχων*: vvhof farther adds, τὸ ἢ παλαιὸν τοῦτο ἦν Ἀθηναίοις νόμισμα, καὶ ἐκαλεῖτο βοῦς ὅτι βοῦν εἶχεν ἐντετυπωμένον. εἰ δὲνα ἢ αὐτὸ καὶ Ὅμηρον νομίζουσιν εἰπόντα, ἐκτόμβοι ἐννεαβοίων. καὶ μὲν κὰν τοῖς Δράκον-το νόμοις ἐστὶν ἀποτίμην δεινάβοιον, καὶ ἐν τῇ παρὰ Δηλίας Σωφίας ἡ κήρυκα κηρύττειν φασὶν ὅποτε Δωρεάν πνι. ἐδίδωτο, ὅτι Δοθήσαν. αὐτῶ τοσούτοι βόες, καὶ δίδωται καὶ ἕκαστον βοῦν δύο δραχμας ἀπὸ τῆς.

This was an ancient coin amongst the *Athenians*, and was called *βοῦς*, because it had the figure of an oxe instamped. They imagine that *Homer* knew this, when he said, καὶ ἐκτόμβοι ἐννεαβοίων, and also in the laws of *Draco*; it is to pay the mulct of ten oxen. And they say, that at the solemn shew at *Delos*, the crier when any gift is to be given, cries so many oxen shall be given, and for every oxe so many *Attick* didrachmes are given. The same

\* *Int. Poll. ibid.*

Author writes, that the *Attick* tetradrachme was stamped vvith the face of *Minerva*, and he might have added with the νοῦνα on the re-

\* *In Anabasis.*

verse. This \* *Eubulus* pleasantly calls *πυλάον* *Minerva pullum*. The *Διόβολον* had the face

Face of *Jupiter*, it may be it is an error in *Pollux*, for *Pallas*, and on the other side the *νοῦνα*. The *τρεῖςβολον* had on the one side *Jupiter*, according to \* *Pollux*, (I conceive it to be a mistake for *Pal-* \* *Iul. Poll. l. 9. c. 6.*  
*las*, or *Minerva*) on the other side two *νοῦνα*, be-  
 cause it was the double to the *διώβολον*. From the  
*diobolū*,<sup>k</sup> *Plautus* uses the term *diobularis Servorum* <sup>1</sup> *Plautus in*  
*Sordidulorum*, *Scorta diobolaria*, which <sup>1</sup> *Festus in*  
*terprets thus, meretrices diobolares appellatas, ex* *Pænulo.*  
*eo quòd duobus obolis ducerentur.* To which I may <sup>1</sup> *Sextus Pom-*  
*adjoin, out of such ancient coins as I have seen,* *peius Fe us*  
*that the triobolum* (whence that phrase of <sup>m</sup> *Plau-* *de Verb. signif.*  
*tus, homo trioboli*, and of the Greeks *ἀξιοτριω-* <sup>m</sup> *Plautus in*  
*βόλυ*) which by <sup>n</sup> *Pollux* is called the *ἡμισιδραχμων*, *Pænulo.*  
 had the face of *Pallas* on the one side, and <sup>n</sup> *Iul. Poll. l. 9. c. 6.*  
 the *νοῦνα* on the other; and so likewise had the  
*obolus*, and *drachma*, of such as I perused, and all  
 of them on the reverse the inscription *ΑΘΕ*. And  
 I think I may safely add, that on such coins as we  
 finde the *νοῦνα*, with a deep relevy, we may  
 conclude them to be *Athenian* coins. ° *Plutarch* ° *Plutarchus*  
 is of the same opinion in the life of *Lyfander*, in *Lyfandro*.  
 where he discourses of *Gylippus* a Commander,  
 as famous for defeating the *Athenians* in *Sici-*  
*ly*, as infamous for stealing the silver consigned  
 to him by *Lyfander*, for the city *Sparta*. When  
 he arrived, saith *Plutarch*, at *Sparta*, he hid the  
 silver that he had stoln under the tiles of his house,  
 and delivered into the hands of the *Ephori* the bags,  
 shewing them the seals [intire]: Which being ope-  
 ned, and the money told, they found the sums to  
 disagree from the labels: wherewith being troubled  
 a servant of *Gylippus* in obscure tearms intima-  
 ted to them, That under the tiles of his Masters  
 house

house there were hid many *noctua*, or owles; ἢ  
 ὃ (ὡς εἶπεν) τὸ χράγμα τῷ πλείονι τότε νομισμα-  
 τῷ, διὰ τοὺς Ἀθηναίους γλαῦκας. For the greatest  
 part (as it seems) of the money then had the stamp  
 of the *noctua*, by reason of the Athenians: who  
 not long before, as *Thucydides*, and the best Hi-  
 storians of those times shew, were the richest,  
 and most flourishing State amongst the Gre-  
 cians.

Having therefore had the opportunity to  
 have bought, or else the favour to have weigh-  
 ed many fair, and perfect Attick tetradrachmes,  
 found at remote places, with the *Pallas galea-  
 ta* on the one side, and the *noctua*, vvith the in-  
 scription AΘE on the reverse, where E being  
 placed for H proves the antiquity of them. (For  
 the Atticks at the first used not H, but onely E,  
 for both E and H) I finde by the best of these  
 (to reassume what I said before) that the At-  
 tick tetradrachme is 268 grains, and the drachme  
 67 of our Troy, or English standard. Which  
 may farther be confirmed by an Attick drachme  
 of mine own, found in the *Black Sea*, vvith  
 this inscription, AΘE TINAPNIKA APXE, and  
 by a \* *πρώβολον*, or semidrachme bought by me at  
*Alexandria*: that weighing neer 66 grains, and  
 this 30 and better: the face of *Minerva*, ei-  
 ther by use, or time being a litle diminifhed in  
 both: but yet so litle, that they cannot have  
 lost above two or three grains of their primi-  
 tive vweight. And as this single Attick drachme  
 of mine is much to be valued by Antiquaries  
 for the vweight, and therefore vv as desired  
 by the learned *Peireskius*: so is the inscription

\* I have since  
 perused a fair  
 Athenian *τε-  
 τράβολον* of my  
 very worthy,  
 and learned  
 friend, *John  
 Marsham* Es-  
 quire, weighing  
 completely 33  
 grains English.  
 As also ano-  
 ther of Sir *Tho.  
 Roes*, together  
 with an *ὀβολός*  
 of his, weigh-  
 ing 11 grains.

TINAPNIKA APXE no lesse worth consideration, for the explication of a place in *P Livy*: who *P Livius l. 37* describing the naval triumph of *L. Aemilius*, vvrites thus, *Pecunia translata nequaquam tanta pro specie regii triumphi. Tetracina Attica CCXXXIII. millia, Cistophori CCCXXII. mil.* Where *q Budens*, and *Rhodiginus* in stead of *q Bud. lib. 2. de tetracina*, read *tetradrachma*. *Tetracinum enim asse.* *quid sit, nemo ut arbitror novit*, saith *Budens*: *Rhodigin: left: antiq. l. 10. c. 2.* I vvould rather read it, as the coin doth, *Tinarnica*: this having almost the same letters vvith *Tetracina*, vvhich by the Scribes, I suppose, have been inverted. Neither is there any reason, why *Livy* might not as vvell mention in this triumph, *Attica Tinarnica*, as *Tetradrachma*; these being the fourth part of the tetradrachme; and therefore better agreeing with his description: *Pecunia translata nequaquam tanta pro specie regii triumphi*: and also better agreeing vvith the *Cistophori* he here mentions: a sort of coin about half of these *Attica Tinarnica*, where-as the *tetradrachma* were eight times as great. For *r Festus* expressing the *talentum Euboicum*, *r Sextus Pompeius Festus de Verbo signif.* renders it by 7500 *cistophori*, and by 4000 *denarii*, or Attick drachmes, that is, *clv. tetradrachmes*. *Euboicum talentum nummo Græco septem millium & quingentorum cistophorum est: nostro quatuor millium denariorum.*

And as these testimonies above alleaged are beyond all exceptions, so the gold coins of the Grecians, which I have examined, doe most evidently prove this proportion assigned to the Attick drachme. Which that vvee may the better understand, vve are to observe vvhat pro-

portion the valuation of the gold of those times had to the silver; and next, vvhhat proportion it had in respect of weight.

<sup>1</sup> *Iul. Poll. l. 9.*  
<sup>5. 3.</sup>

<sup>2</sup> *Scholias-  
 Aristophanis.*

For the first, <sup>1</sup> *Iulius Pollux* in very perspicuous terms, puts it down, Τὸ δὲ χρυσίον ὅτι τοῦ ἀργυρίου δεκαπλάσιον ἦν σαφῶς ἂν τις ἐκ τῆς Μενάνδρου παρακαταθήκης μάθῃ. *That the gold was in a ten-fold proportion to the silver one may evidently learn out of Menanders' paracatathece.* <sup>2</sup> *The Scholiast of Aristophanes* implies as much. Εἰσὶ μὲν χρυσοὶ σατῆρες οἱ Δαρεικοί. ἐδύνατο δὲ ἕκαστος αὐτῶν, ὅπερ ὁ παρὰ τοῖς Ἀθηναίοις ὀνομαζόμενος χρυσὺς, ἐκ ἀπὸ Δαρείου τοῦ Ξέρξης πατρὸς ἀλλ' ἀφ' ἐτέρου πνὸς παλαιότερου βασιλέως ὀνομασθήσαν. λέγουσι δὲ πνὸς δύνανται δὲ Δαρεικὸν δεκαχμᾶς ἀργυρίου εἶκοσιν. ὡς τὰς πέντε Δαρεικὸς δύνανται μίαν ἀργυρίαν. *The Darics are golden stuters, each of them is worth as much as that which is named by the Atticks the χρυσὺς. They are called so not from Darius the Father of Xerxes, but from another King more ancient then hee. Some say that the Darick is valued at XX. drachmes of silver, so that V. Darics are worth a mina of silver. For the Attick μνᾶ, or mina, containing an hundred drachmes in weight, as it is very cleer out of* <sup>3</sup> *Pliny*, <sup>4</sup> *Pollux*, and others. *Mna* (saith *Pliny*) *quam nostri minam vocant, pendet drachmas Atticas centum.* And *Pollux*, Ἡ μνᾶ δὲ παρ' Ἀθηναίοις ἑκατὸν εἶχεν δραχμᾶς Ἀθηναίων: *The mina with the Athenians containeth an hundred Attick drachmes, and the χρυσὺς Δαρεικός, or σατὴρ χρυσοῦς of Darius, consisting of two drachmes in weight, as we shall presently prove, it will necessarily follow that the proportion of the δραχμὴ χρυσοῦς, was*

<sup>3</sup> *Plinius l. 21.*  
<sup>6. 34.</sup>  
<sup>4</sup> *Iul. Poll. l. 9.*  
<sup>6. 3.</sup>

to the δραχμὴ ἀργυρία, in decuplâ ratione: and therefore that five Daricks, or ten drachmes of gold, were equall in valuation to an hundred drachmes in silver, that is, to the μνᾶ. The same

proportion may be collected out of <sup>γ</sup> Polybius, <sup>γ</sup> Polybii ἱστο-  
vwhen the Romanes upon a summe of mony to γαίπερι πρε-  
be received, concluded a peace with the Αἰτο-  
lians. Ἀντὶ τριῖτε μέρους τοῦ ἀργυρίου χρυσίον, χρυσίον  
ἐὰν βέλων) διδόντες τῷ δέκα μνῶν ἀργυρίου, χρυσίον  
μνᾶν. Which words <sup>2</sup> Livy renders thus. Pro argen-  
to si aurum dare mallent, dare convenit, dum pro  
argenteis decem aureus unus valeret. This being  
granted, as certainly of necessity it must, I would  
correct that place of <sup>2</sup> Hesychius concerning the  
δραχμὴ χρυσία, and read it thus, Δραχμὴ ὅ χρυσία  
ὅλην νομίσματος εἰς ἀργυρίου λόγον δραχμῶν ἰ'. & not  
διδραχμῶν ἰ'. as it is in the printed copies. And  
by this of Hesychius I would supply the defect of  
<sup>b</sup> Suidas, who writes. Δραχμὴ ὅ ὅλην νομίσ-  
ματος εἰς ἀργυρίου δραχμᾶς ἰ'. and make it thus,  
Δραχμὴ ὅ χρυσία ὅλην νομίσματος εἰς ἀργυρίου λόγον  
δραχμᾶς ἰ'. For without the addition of χρυ-  
σία, and λόγον, there is no sense: And I beleieve  
Suidas took these very words out of Hesychius.

<sup>2</sup> Livius l. 38.  
παρὰ ὃ τοῖς  
Ελλήσιν κ'  
δραχμῶν τὸ  
χρυσὸν ἀλλά-  
τῆται νόμισ-  
μα. Zonaras.  
<sup>2</sup> Hesychius in  
voce δραχμή.

<sup>b</sup> Suidas in vo-  
ce δραχμή.

Having thus found the proportion that the  
δραχμὴ χρυσία had to the silver, our next inqui-  
ry is, how many of these drachmes in weight  
the χρυσῆς, or χρυσῆς στατήρ, or aureus contained.  
<sup>c</sup> Julius Pollux gives us in this particular the best, <sup>c</sup> Jul. Pollux  
and most positive information of any, ὅ ὃ χρυσῆς libr. 4. c. 24.  
στατήρ δύο εἶχε δραχμᾶς Ἀττικᾶς. The golden sta-  
ter [or aureus] contains two Attick drachmes.  
The same is confirmed by <sup>d</sup> Hesychius: Πολύ-  
μαρχος φησὶ δύνασθαι τὸ χρυσὸν παρὰ τοῖς Ἀττικοῖς  
voce χρυσῆς.

δραχμὰς δύο· ἢ ὃ τῷ χρυσοῦ δραχμὴν νομισμα-  
 τος ἀργυρίου, δραχμὰς δύο. *Polemarchus* saies that  
 the aureus amongst the Athenians contains two  
 drachmes, and that the drachme of gold is worth  
 ten drachmes of silver. And to this of *Pollux*  
 and *Hesychius* all the aurei of the ancient  
 Grecians, which have passed through my hands,  
 doe very well correspond. Now these aurei as  
 they had severall impresses upon them, so had  
 they severall names, by which they are distin-  
 guished. For they were either Ἀθηνοὶ, or Δα-  
 ρεικοὶ, or Φιλιππειοὶ, or Ἀλεξανδρειοὶ, or the like,  
 all which we may prove by *Xenophon*, \* *Harmo-  
 cratio*, the *Scholiast of Aristophanes*, and others,  
 to have been equall unto two Attick drachmes,  
 and therefore respectively equall to one ano-  
 ther. Neither is this much to be wondred at,  
 that the Grecians, and Persians, though at enmi-  
 ty amongst themselves, yet should agree in the  
 aurei; seeing that in our times, the Venetian  
 Chequeen, the Barbary Ducat, the Egyptian,  
 and Turkish Sherif, are almost all of the same  
 purenesse in respect of the gold, and not differ-  
 ring above a grain in the weight. Which differ-  
 ence we may also allow to those of the An-  
 cients, without any prejudice to our inquiry.  
 Concerning these aurei, or golden staters, the  
 observation of *Julius Pollux* is worth our con-  
 sideration, Καὶ οἱ μὲν Δαρεικοὶ ἐκάλυντο σατῆρες,  
 οἱ δὲ Φιλιππειοὶ, οἱ δὲ Ἀλεξανδρειοὶ, χρυσοῖ πάντες ὄν-  
 τες, καὶ εἰ μὴ χρυσοῦς εἴποις ποσειδικέῃ ὁ σατῆρ, εἰ δὲ σατῆρ  
 εἴποις ἐ πάντως ὁ χρυσοῦς. Of the staters some were  
 denominated from Darius, some from Philip, some  
 from Alexander & were all of gold. And when you say  
 the

\* Λίγαι δὲ  
 τινες δύνασθαι  
 ἢ Δαρεικὸν  
 ἀργυρίου  
 δραχμὰς κ' (as  
*Ios. Scaliger*  
 rightly corrects  
 the printed co-  
 pies, which ren-  
 der it ἡ or ὁκ-  
 τῶ) ὡς τὸς  
 πέντε Δαρεικοῦς  
 δύνασθαι μὲν  
 ἀργυρίῳ. *Har-  
 pocr.* Τριχίλι-  
 οὶ Δαρεικοὶ  
*Xenophonti*  
 sunt δ' ἐκ τῶ  
 λαντα. *Talen-  
 tum autem 600*  
*drachmae. Ergo*  
*Δαρεικὸς sunt*  
*20. drachma.*  
*Scal. de re num.*  
 \* *Iul. Poll. l. 9.*  
 ε. ε.



the aureus, the stater is understood, but if you say the stater, the aureus is not always meant. And this is most true; for the χρυσῆς, or aureus (I speak not here of the aureus Romanus, this being somewhat lesse then these mentioned by Pollux) did alwaies imply the σάτρη, but the σάτρη did not alwaies infer the aureus: the stater being more generall, signifying as well the argenteus, as the aureus, and that was double to this; the stater argenteus being four drachmes, as we proved before, and therefore the same with the tetradrachme, & the aureus two drachmes, and therefore equall in weight to the didrachme. Wherefore every aureus was rightly called a stater, but every stater could not rightly be called an aureus.

From these aurei then, or χρυσοὶ σάτρηες, we may deduce the silver Attick drachme, if we either had the Δαρικοί, some of which to this day are found in Persia, or if we had the Φιλίππειοι, or the Ἀλεξανδρείοι. To passe by the Δαρικοί, because I have not perused any of them, and to speak onely of the Φιλίππειοι and Ἀλεξανδρείοι, of which there are many extant.

Concerning the Φιλίππειοι \* Snellius writes \*, Snellius de re thus. *Philippi nummum unicum, & Alexandri nummaria. Macedonum, solertissimus veterum nummorum aestimator Nicolaus Rockoxius possidet, utrumque eodem ponere granorum 179. Now CLXXIX. grains of gold in Holland, such as Snellius used, are answerable to an hundred thirty four grains English and an half. Neer vvhich proportion I have observed two others, with the inscription ΦΙΛΙΠΠΟΥ, excepting onely a grain, or two.*

As for the Ἀλεξανδρείοι, I finde the weight of

one of the fairest for impression, and character, I think in the world, which I bought at *Alexādrīa*, with the image, and inscription ΑΛΕΞΑΝΔΡΟΥ, to be exactly of English grains  $133\frac{1}{4}$ , and another at *Constantinople* 133, and in the same proportion severall others. With which comparing one of mine honoured and learned friend *John Marshā* Esquire, I find his a grain defective: And weighing since some others out of that choice, & rare *καμύλιον* of ancient coins collected by the noble Sir *Simonds D' Ewes*, Knight Baronet, I observed two of his to exceed 133 by  $\frac{1}{4}$  a grain.

Wherefore I may conclude (allowing onely half a grain for so much wanting by time, or by the mint) from the *aureus* being double to the Attick drachme, that it hath been rightly assigned by me to be *LXVII.* grains; And from this with those limitations above mentioned I may conclude the *denarius Consularis*, (which is our principall inquiry) seeing *Galen li.8.c.3.* *de compositione Medicam:* according to the Latine manner of division), speaking of an antidote prescribed by *Asclepiades*, whereof the *dosis* was to be one drachme, or *denarius*, writes thus. Ἡρῶμαι ὃ λέγειν αὐτὸν δραχμὴν ἀργυρεῖαν, καὶ ὃ ἔπεω χειρὸν ἀπασιν τοῖς νεώτεροις ἰατροῖς ἔδος ὀνομάζειν. ἄλλο ὃ νοεῖν ἡμᾶς ἐδὲν ἢ τῷ περὶ ματῶ φύσιν ἀνασχάξει. περὶ δηλον δ' ὅτι δραχμὴν λέγουσι νῦν ἐν τοῖς τοιούτοις ἅπαντες, ὅπερ Ῥωμαῖοι δυνάμιον ὀνομάζουσιν. I suppose, that he means the silver drachme, for so all the later Physicians are wont to call it, neither will the nature of the thing suffer us to understand any other. And it is manifest that in such things as we all now name the drachme, the

f *Galenus* l.8.  
de compositione medicam.

the *Romanes* name the *Denarius*.

The *denarius* also, as we proved before out of *Philo*, *Iosephus*, *Saint Hierome*, and *Hesychius*, may be inferred by the Hebrew, or Samaritane shekel: the shekel, by the joint testimony of all of them, being equall in valuation to the Attick *stater argenteus*, or *tetradrachme*, and the Attick *tetradrachme*, as we have shewed, to 4 *denarii Consulares*: if therefore an Hebrew, or Samaritane shekel in silver, fair, and not impaired, were found, we might by this as well discover the *denarius*, as by the *tetradrachme*, or the *aureus*. And here I must confesse I have not seen so many perfect, and entire, with the Samaritane characters, vvhich certainly are the best, and truest, (For those with the later characters, invented, as some suppose, by *Esdra*, are most of them counterfeit) as to give my self satisfaction. For though I have perused that of *Arias Montanus*, now in the University of *Oxford*, which he describes in his tract *de Siclo*, and from whence he deduces the proportion of the Hebrew shekel, yet to speak the truth, there is no trust to be given to it: Not but that the coin is very ancient, and the inscription upon it in Samaritane characters well made; but the sides of it have been so filed away, that it hath very much lost of the true weight. For I finde it to be scarce the weight of twenty pence of our English Standard. Whereas *Montanus*, if he made his observation exactly, equals it to almost four Spanish rials, or to four Romane *In-lis*: both which exceed two of our English shillings. So that till such time as I may procure out  
of

*Arias Montanus de siclo. in libro qui inscribitur Thubal Kain, sive de mensuris.*

of the East, (whither I have often sent) some perfect shekels, I must be content to take up the relations of others. And here I shall begin with *Moses Nehemani Gerundensis* a Jew, a learned expositor of the Pentateuch, who as *Arias Montanus* tels us, flourished in *Catalonia* above 400 years since. His words, as *Montanus* hath delivered them in his tract *de Siclo*, are these. & In comment, *Exod. 39. multis verbis differens significabat se non facile ad Salomonis Iarrhai, qui ante illum in Galliâ scripserat, sententiam de siclo accedere; cum Salomon affirmasset, Siclum esse dimidiam argenti unciam. Postea jam absoluto in omnem Legem Commentariorum opere, idem Moses Gerundensis capite ad eam rem propriè addito, sicli estimationem à Salomone illo indicatam, re ipsâ doctus, ingenuè, & aperte, ut viros doctos, & veri inveniendi, atque docendi cupidos decet, comprobavit. Narrat autem se eo anno, quo illa scriberet, in Palestinam ex Hispaniâ sacrarum locorum visendi causâ navî delatum Acconam, quam nunc Iachan vocant, devenisse; ibidemque sibi ab incolis ostensum fuisse nummum argenteum antiquissimum, expressis tamen signis & literis conspicuum; in cujus altero latere forma esset vasculi illius, quod mannâ plenum in sacra arca ad seculorum monumentum, Dei jussu, & Moysi procuratione fuerat repositum: & in altero ramus ille admirabilis, quem in fasciculum virgularum plurimarum Aaronis nomine illatum (cùm illius sacerdotali dignitati ab amulis quibusdam obtrectaretur) posterâ die populus omnis florentem, amygdalâque explicantem vidit; inscriptiones etiam fuisse in eodem nummo Samaritanis characteribus*

bus, quæ olim communes totius Israelis literæ fuerant, ante discessionem decem tribuum à duabus, lingua planè Hebraica, quarum exemplum ex alterâ parte erat SEKEL ISRAEL, quod Latine sonat Siclus Israelis: ex alterâ verò IERVSALEM KEDESSAH, hoc est Ierusalem sancta: qui nummus antiquitatem cùm primis magnam probabat, utpote cusus nomine Israelis, eo tempore quo omnes XII. tribus communi concordia Israelis nomen obtinebant; quòque Hierosolyma ipsis omnibus regia urbs, sanctaque erat; eademque communis omnibus & religionis, & publicæ rei, & moneta, atque literarum ratio, quæ postea discessione factâ, alia atque alia utrique parti fuit. Namque Iudæi, ut omnes ferè scriptores afferunt, necum Schismaticis Israelitis ullo Sacrorum usu communicarent, eam Literarum formam, quæ nunc etiam in usu est, hoc est quadratam, mutatis valde alterius prioris figuris, adinvenère. Affirmat præterea idem Gerundensis, nummum illum, qui Siclus inscribebatur, sibi in staterâ pensum dimidia argenti uncia pondus reddidisse, ostensam quoque alteram monetam dimidiato pondere minorem, iisdem omnino vasis & rami figuris quæ tamen non SEKEL, sed HHASZI SEKEL, hoc est dimidius Siclus diceretur, probari itaque sibi vel maximè Salomonis Iarvhei, de sicli pondere, & valore, sententiam. Thus far Gerundensis: who if he had expressed with what half ounce he compared his shekel, or if Montanus had done it for him, they had given the judicious Reader better satisfaction. But this I suppose, by a probable conjecture, may be supplied, in saying that he living in Catalo-

<sup>b</sup> *Eadem omni-  
no sunt uncia,  
quibus olim  
Romani, Hispani-  
que utuntur.  
&c.*

*Villalp. de ap-  
par. Urb. ac  
Templi par. 2.  
l. 3. c. 20.*

<sup>i</sup> *Ciaconius de  
ponderibus pag.  
45.*

<sup>k</sup> *Villalpand. de  
app. Urbis ac  
Templi par. 2.  
l. 2. diff. 1. c. 28.*

\* We may also  
insert the ob-  
servation of  
*Anton. Au-  
gust. dialo-  
go 2. Ne ho-  
mo [sic] che  
è d' argento, &  
è di peso di  
quattro dramme  
conforme à  
quello che dice  
San Girolamo  
sopra Ezechiel-  
le: where by  
four drams  
he means half  
the Roman  
ounce.*

*nia weighed it with the Catalonian, or Spanish  
half ounce; which <sup>b</sup> Villalpandus, and Ciac-  
onius, both of them Spaniards, make equall to  
the half ounce now used at Rome, that is, to  
two shillings three pence farthing, q. of our  
mony, This conjecture of mine will exceeding  
well confirm those many observations of Vil-  
lalpandus, a man in this kinde very curious,  
which he made of severall ancient shekels in  
silver, who thus writes. <sup>k</sup> *Igitur ante aliquot an-  
nos appendimus Siclum unum apud F. Vrsinum,  
& postmodum eos omnes, quos precedenti capite  
percensuimus, atque comperimus singulos argenti  
siclos ex aequo semuncia Romana antiquae responde-  
re; ita ut ne minimum quidem hordei aut fru-  
menti granulum, huic, vel illi lanci addi potuerit,  
quin in eam examen propenderet. Nec mirum  
cuiquam videri debet, antiquissimos nummos suo  
pristino ponderi nunc respondere, neque ullam ar-  
genti partem vetustate consumptam tot seculis  
fuisse. Nam singulari Dei beneficio nobis conti-  
git, tot integros appendere potuisse siclos. Id quod  
nummi ipsi integri vetustatem maximè præ se  
ferentes, literæ expressæ, extantisque, argenti  
color, atque alia id genus multa, facile probant.*  
With these observations of Villalpandus I finde  
the weight of a very fair Samaritane shekel of  
the truly noble, and learned M. Selden to agree:  
to whom I stand obliged for this favour, as he  
doth for the coin to the honourable Antiquary  
Sir Robert Cotton. To these testimonies, though  
(it may be) sufficient of themselves, I shall add  
\* one more, for farther illustration of the weight  
of the Hebrew, or Samaritane shekel, and that  
is*

is of an ancient, and fair one, in silver, amongst his Majesties coins, perused by the most reverend *Primate of Ireland*, a man of exquisite learning, and judgement, who hath often assured me that it weighs two shillings five pence of the English standard; which proportion excepting some few grains, in which it doth exceed, does well correspond with those of *Villalpandus*. And this may farther be confirmed out of the Talmud <sup>1</sup> כל כסף האמורה בחורה כסף צורי <sup>1</sup> Kiddushf. 11. ושל דברי ה— כסף מדינה *Argentum omne cujus in Lege fit mentio, intelligitur argentum Tyrium* (ponderis & bonitatis ut in urbe Tyri: as <sup>m</sup> Schlinder interprets it) sed Rabbiorum argentū <sup>n</sup> Schindlerus in pentaglotto intelligitur argentum commune provinciale. Taking therefore the silver money of Judea, as the Talmud doth, to be equall to the Tyrian, and that of Carthage to be equall to that of Tyre: as it is very probable, that the Carthaginians, being a plantation of the Tyrians, might observe their proportions in coins, as vvell as their customes, in religion, we may by these discover the shekel to be much about the same weight that hath been assigned. For <sup>n</sup> Ant. Augustinus, describing <sup>n</sup> Ant. Augusti dialog. 6. in his dialogues the weight of two fair Carthaginian coins in silver, writes, that they are each of them somewhat more then four drachmes, that is, as he elsewhere explains himself, a litle more then half the Romane ounce. If therefore we shall adhere to the observation of *Gerundensis*, made four hundred years since, or to these later of *Villalpandus*, and others; or to this conjecture of mine, the Hebrew shekel, and half the present Romane ounce, are either both the

the same, or else very neer in proportion.

And this may easily be granted ; but if it be, how vwill 4 *denarii Consulares*, 4 Attick drachmes, and the Hebrew shekel, be reciprocally equall one to another, as they should be by those severall testimonies before alleaged ? Whereas by many hundred *denarii Consulares*, tried by an exact balance, I finde the best of these to contain LXII. grains English, and the Attick drachme LXVII. And the fourth part of the shekel to be but LIV. grains  $\frac{3}{4}$ , if we admit of *Gerundensis*, and *Villalpandus*' observations. Which notwithstanding according to *Philo*, *Iosephus*, *Saint Hierome*, *Epiphanius*, and *Hesychius*, should be equall to the Attick drachme, and the Attick drachme by the testimonies of the ancients should be likewise equall to the *denarius*. For the solution of this objection I answer. First, that the *denarius*, and Attick drachme, being distinct coins of different States, and not much unequall in the true vweight, it is no wonder, especially in *Italy*, and in the *Romane* dominions, that they should passe one for another : no more then that the *Spanish* rials in our Sea Towns in *England*, should passe for testars, or the quarters of the dolar be exchanged for our shillings : whereas the riall in the intrinsecall valuation is better then our testar by four grains, and somewhat more, and the quarter of the dolar is better then our shilling by more then 8 grains, or a penny ; but because they want the valuation, character, and impression of our Princes, vvhich I call the *extrinseck* of coins, therefore doth the *Spanish* mony fall from



from its true value with us, and so would ours doe in *Spain*. By the same analogy must we conceive the *Attick drachmes*; though in the intrinsic they were somewhat better worth than the *denarius*, yet for want of the extrinsic, to have lost in *Italy*, and thereby to have become equall in valuation to the *denarius*. And this seems to be implied by *Volusius Metianus*. *Victoriatum enim nunc tantundem valet, quantum quinarium olim. At peregrinum nummum loco mercis, ut nunc tetradrachmum, & drachma, habebatur.* These words of *Metianus I* finde in a *MS.* of *Temporarius* thus corrected: *Victoriatum enim nunc tantundem valet, quantum quinarium olim ut peregrinum nummum loco mercis, ut nunc tetradrachmum, & drachma habebatur.* Whether it be by conjecture, or that he found it in some ancient *MS.* I know not, but the commendation I cannot but approve.

*P**Eudæus drachmam putat ejusdem ponderis esse cum denario, Onuphrius verò inter utrumque statuit rationem sesquiterciam, Agricola sesquiseptimam, ut Parvinio tres denarii quatuor drachmas, Agricola verò septem denarii octo drachmas efficiant. Capel. de pond. & nummis l. i. LXXXIV. denarii, quæ est Libra Romana, sunt æquales XCVI. drachmis, quæ est libra Italica, & medica. Scal. de re nummariâ.*

because

because in ordinary commerce, and in vulgar estimation they passed one for another, in the Romane state; or else if any were so curious to observe their difference, as surely the κομμοὶ *μισαὶ* were, yet by reason of their neernesse, and to avoid fractions, and having no other names of coins that were precisely equall, whereby to render them, therefore all Greek, and Latine Authours, mutually used one for the other. And secondly, because some Writers, as *Dioscorides* and *Cleopatra* affirm, that the Romane ounce contained eight drachmes, therefore modern Authors infer, that the *denarius* being equall to the drachme, and eight drachmes being in the Romane ounce (as so many were in the Attick) that therefore there are eight *denarii* in the Romane, and consequently that the Romane, and Attick ounces are equall. Whereas *Celsus*, *Scribonius Largus*, and *Pliny*, as we shewed before, expressly write, that the Romane ounce contained in their time, which was after *Dioscorides*, seven *denarii*. And being naturall Romanes, and purposely mentioning the proportion of the *denarius* to the ounce, thereby the better to regulate their *doses* in physick, it is not probable, but they must better have known it then the Grecians. Besides, vvho with any certainty can collect out of these imperfect fragments of *Dioscorides*, and *Cleopatra* (for those tracts of theirs *de ponderibus* are no better) whither at the first they wrote in that manner, as they are now printed? Or if they did, why might not they indeavour to introduce into the Romane ounce, in imitation of the Attick,

tick, that manner of division, which is now generally received in our times, of making the ounce, of vvhhat kinde soever it be, to contain eight drachmes. And surely this of eight being a *compound number*, as Arithmeticians use to speak, was much fitter then seven, used by the Romanes, which being a *prime number*, is therefore incapable of any other division. And then for to conclude, that because the Attick ounce had eight drachmes, and the Romane as many, that therefore their ounces are equall: is all one as to conclude, that the Paris, and English ounces are equall, because the French as well as we (and so doe all Physicians of all Countries that I know) divide their ounce by eight drachmes. And thus, I suppose, I have sufficiently answered the first part of the objection, concerning the *Denarius*, and the Attick drachme: that if we respect the vulgar and popular estimation, in which sense classically Authours understood them (For they could not well otherwise render them, then as they were currant) so were they equall; but if we respect the intrinsecall valuation, which depends upon the weight, especially when coins are of a like finenesse, so were they unequall: the Attick drachme being of our money eight pence farthing *q*, and the *denarius Consularis* seven pence half penny farthing: allowing for the standard

\* VIII. English grains to the silver penny.

\* These proportions, with those before, & those which follow, are taken from the English standard at five shillings the ounce (as it was formerly coined) to avoid fractions: that is, eight grains to the silver penny: whereas in these times it is five shillings.

two pence. Not that the ounce is increased, for this is alwaies constant and fixt, but that for reasons of State, our silver coins are diminished, and consequently contain fewer grains. And this diminution must necessarily be, as often as other Nations, with whom we have commerce, rebate in the proportions of their coins; or else we must be content to be losers.

Neither do I know any authority, that either expressly, or by a true, & logical consequence, can be produced out of Classical Authors to infringe this assertion of mine, unlesse it be one in *Fannius*, which being a fragment is the lesse to be valued: and another in *Livy*, who thus writes, *tib. 34.* in his description of the triumph of *Quinctius*. *Signati argenti octoginta quatuor millia fuere Atticorum, tetradrachmum vocant; trium fere denariorum in singulis argenti est pondus.* Which words of his occasioned *P. Georgius Agricola*, not knowing how to answer them, to bring in a distinction of three sorts of *denarii*: the *Gravis*, weighing an Attick drachme, and an half, the *Mediocris*, one & a seventh part, the *Levis*, most commonly one; without any cleer proof, or evidence in any ancient Author, and directly contrary to all ancient coins of the Atticks, and Romanes, which I have seen: of which error he would not have been guilty (For there is no man that hath writ either *de ponderibus*, & *mensuris*, or *de re metallicâ*, more solidly, and judiciously then he) if he had been so happy as to have perused many intire Grecian *aurei*, & *tetradrachmes*, or else to have examined a greater, and more select quantity of Romane coins. To satisfie my self concerning that place of *Livy*, I had recourse to our *MSS.* here (and I could wish I had done the like in *Italy*) and these I finde to agree with the printed copies; though the coins, which are much ancients than any *MSS.* constantly disagree. Wherefore if it be not a mistake in *Livy* himself, which I am not apt to believe in so grave an Author, I would correct

P. G. Agricola  
responsio ad Al-  
cialum de pond.  
& mensuris.  
Argentei Ro-  
manorum de-  
narii triplices  
sunt: graves,  
qui pendunt  
drachmam At-  
ticam cum di-  
midia: medio-  
cres, qui drach-  
mam & septi-  
mam ejus par-  
tem: leves, qui  
plerumque  
drachmam.

correct the copies by the coins, and instead of *III. fere denariorum*, make it thus, *IV. fere denariorum*. Where the figure *V*, being resolved into two lines, and left a little open at the bottom, might easily be taken by the scribe for the figure *II*. And this I doe certainly \* beleieve is the true ground of that errour, wherewith so many of late have been perplext. However it were, it is as ancient as *Priscian*, or *Pseudo-Priscian* (as *Capellus* styles him) who, in his tract *de ponderibus*, reads those words of *Livy* in the same manner, *trium fere denariorum*.

As for the *denarius aureus*, a name I think not known to the Ancients, which *Salmasius* and others collect out of *Livy*, *de fœdere Ætolico*. *Pro argento si aurum dare mallent, dare convenit, dum pro argenteis decem aureus unus valeret*. I see no solid foundation for that opinion; all that can be collected thence is, that the gold then was in *decuplâ ratione* to the silver, which I have proved before. And whereas *Plautus* hath his *denaria Philippea*.

*Nummi octingenti aurei in marsupio infuerunt,*

*Præterea centum denaria Philippea.*

this is a metaphorical, or comical expression of him, and no certain sort of coin: which he pleasantly calls *denarii*, because half the *χρυσῶν διαπεντακοίων* were equall in weight to the *drachma*, and so also was the *Romane denarius* supposed to be,

Nor are we to take the *κλῶσος*, which is thrice mentioned by Saint *Matthew*, and once by Saint *Mark*, for the *denarius*, as some have done: no, nor for any other sort of coin. For it is pre-

\* If this answer be not satisfactory, we may say, as some have done, that *Livy*, *Fannius*, and the Scholiast of *Nicander*, speak of the *denarii* of the former Consuls immediately succeeding *Q. Fabius*,

For there being but six of those in the ounce, (as they suppose) the *denarius* will be greater then the *drachma*, as it will be lesse when seven were coined, under the later Consuls, which is our assertion. *Livius* l. 38. *Plautus* in *Rudente*.

cisely the Latine word *census*, that is, ὁ φόρος *tributū*, and so is it rendred by Saint *Luke*, Εξέσται Καίσρει φόρον δέναι, ἡ' ὅ; vvhre Saint *Matthew*, and Saint *Mark* have it. Εξέσται δέναι κλῶσον Καίσρει, ἡ' ὅ; Though *Hesychius*, and *Moscopolus*, both upon an errour, interpret it a sort of coin. *Hesychius*, Κένσος εἶδος νομίσματος ὀπικαράλαιον, or νομίσματος ὀπικαραλαίον, as *M. Casaubone* corrects it: and *Moscopolus*, Κλῶσος νόμισμα δραχμῆς ἰσάπων, the *census* is a coin equall in weight to the drachme, that is, in the notion of the Greeks equall to the *denarius*. The errour of these two Greek Grammarians, is a misunderstanding the propriety of the Latine word *census*: and that occasioned them to take κλῶσος, and νόμισμα τῷ κλῶσι, for the same. But the Evangelist *Matthew* puts a manifest difference between κλῶσις *tributum*, and νόμισμα, the mony that was paid for tribute. Επδείξατέ μοι τὸ νόμισμα τῷ κλῶσι, writes Saint *Matthew*, shew me the mony of the tribute: or as our new Translation renders it, Shew me the tribute mony. And the three Evangelists, *Matthew*, *Mark*, and *Luke*, immediately after expressly tearm this mony the δλωδειον. Οἱ δ' ἀνεβήσαν αὐτῷ δλωδειον, And they brought unto him a penny. Which being a Roman coin, and currant amongst the Jews, being then in subjection to the Romanes, it is more then probable that they paid their tribute to *Cesar*, in the same species of mony that was used by *Cesar*: and not with any new, or peculiar sort of coin, according to *Baronius* (which *M. Casaubone* hath justly confuted) but with the ordinary currant mony of *Rome*, and that was the *denarius*.

Our

Our next solution should be of the *shekel*, how it could be equall to the *tetradrachme*, and consequently to 4 *denarii*, when by the constant weight of the best Hebrew, or Samaritan *shekels*, extant, wee finde them to bee much lesse. And here I am a little unsatisfied, how to reconcile the coins to *Philo*, *Iosephus*, *Epiphanius*, Saint *Hierome*, and *Hesychius*: or else, if we admit of the coins (as I know no just exceptions against them) how to excuse these Authours of too supine negligence in comparing them, if so be they ever were so curious as to collate them with the Attick *tetradrachmes*. For if we shall say that the silver *stater*, or Attick *tetradrachme*, was a forain coin, in respect of the Rep. of the Jews, and therefore that in *Judea* it might somewhat fall from its true valuation, we shall say no more then what reason, and experience confirm. But then that the *tetradrachme* should sink so low, as to loose four pence half penny, if we take the reverend *Primates* observation before mentioned; or which is more six pence *q.* if we follow that of *Gerundenfis*, and *Villalpandus*; or those of mine, upon two shillings nine pence half penny, for so much was the *tetradrachme* of our mony, it may seem too great a diminution: especially the Attick mony being as pure, and fine, as that of the *shekel*: and therefore no Goldsmith amongst the Jews, but would have given a greater rate onely to melt it, and turn it into bullion. Yet on the other side, when I consider the practise of the mony-changers amongst the Jews at this day, which it may be

\* At my being in *Egypt* thirty five *madines* passed for a dollar: *Sands* in his travails writes forty.

vvas as bad in *Philos*, & *Iosephus* time, & might occasion our Saviour not long before to vvhipe them out of the Temple, which they by their extortions had made a den of theeves, who now make it a trade at *Alexandria*, and elsewhere, in changing Spanish dollars into \* *madines* (or the small silver mony currant in *Egypt*) to gain one or two *madines* upon every dollar, notwithstanding the Spanish mony is as frequent, and as vvell known in *Turky*, as their own. I can the better imagine they might make the same advantage, or a litle more, upon the Attick tetradrachmes: vvhich it may be also vvere not permitted, being contrary to their law, to passe so generally vvith them, as the Spanish mony now doth (by reason of the image of *Pallas*, and the *noctua* instamped: ) or if they vvere permitted, yet they might not be so common, and so vvell known: and therefore upon strangers in *Iudea*, in giving them currant mony, for that vvhich vvas forain, they vvould gain so much the more. So that *Philo*, and *Iosephus*, vvhen they equall the shekel to the tetradrachme, may have taken it upon the relation, and practise of these mony-changers, and not upon any experiment of their owne. The same answer may serve for *Epiphanius*, Saint *Hierome*, and *Hesychius*: though it may be these borrowed their descriptions from *Philo*, or *Iosephus*, vvho long preceded them: and being Jews, and living in the time vvhen the State of the Iews vvas in being, vvhereas these did not, their authority is the more to be credited. And thus have vve finished our inquiry of the

*denarius*



*denarius Consularis*; by comparing it vvith the Attick drachmes, and the Hebrew shekels.

The last, and best vway to discover the true vveight of it, is by the *Congius Romanus*, where- of by a speciall providence, as <sup>a</sup> *Patus*, and *Vil-* <sup>a</sup> *Patus l. 3. de*  
*lalpandus*, have vvell observed, the originall stan- *antiqu. liquid.*  
dard of *Vespasian* is still extant in *Rome*. This, as *arid. que mens.*  
the superscription upon it *X P* demonstrates, *Villalp. de ap-*  
contains the vveight of ten Romane pounds, and *par. Urbis ac*  
is equall (by the joint confession of all Authors *Templi par. 2.*  
*l. 3. c. 25.*

treating this argument) to six *sextarii*. Again, the *sextarius*, as <sup>\*</sup> *Galen* vvrites, *ἔχει μίαν λίτραν καὶ ἡμίσειαν καὶ ἕκτον, ὥς εἶναι τὰς πέντε ἐγχείας κα'.* <sup>\*</sup> *Galen l. 1. de*  
contains one pound and an half, and a sixth part, so *compos. medi-*  
that it hath in all twenty ounces. Or as <sup>b</sup> *Oribasius*, *cam.*  
Physician to *Julian* the Apostate; informs us, is <sup>b</sup> *Oribasius l. 2.*  
equall to the Romane pound, and eight ounces. *ad Eustathium*  
*filium.*

*Ἰταλικὸν κεφάλαιον ἔχει ξέσας μὴ. ξέσας λίτραν μίαν, καὶ ἑξήσας ἡ.* The Italian Amphora contains forty eight *sextarii*, and the *sextarius* one pound and eight ounces. The capacity therefore of this *Congius* being filled up vvith sixe *sextarii*, of some certain sort of liquors (For it is *liquorum mensura*) vvill give us ten Romane pounds, and consequently their ounces, and *denarii*. The onely difficulty is; with what sort of liquor we must measure it: for all liquors are not of the same gravity. And this is well cleered by <sup>c</sup> *Rhemnius* <sup>c</sup> *Rhemius Fann:*  
*Fannius*, and others. *carmina de*  
*pond. & mens.*

*Illud praterca tecum cohibere memento;*

*Finitum pondus variis servare liquores.*

*Nam Libra, ut memorant, besse sextarius addet,*

*Sen pueros pendas latices, sen dona Lyai.*

<sup>d</sup> *Agricola* l 3.  
de ponder. rer. n.

\* *Sextus Pomp.*  
de verb. signif.

<sup>f</sup> *Fragmenta*  
*Dioscoridis.*

\* The propor-  
tion that rain  
water hath to  
fountain water,  
is as 10 0000

to 1007522, &  
the proportion  
that it hath to  
water distilled,  
is as 1000000

to 997065, as it  
hath been ob-  
served by *Snel-*

*lius* in *Eratoſth.*  
*Bat* l 2 c. 5.

*Est in aquali*  
*mole ratio aque*  
*pluviae ad ar-*  
*stillatam, quæ*  
*admodum*

1000000 ad

997065. plu-

viae autem ad

putealem ut

1000 00 ad

1007522.

The *sextarius*, saith *Fannius*, contains one pound and eight ounces, whither vve weigh cleer water, or vvine : where by wine, according to <sup>d</sup> *Agricola*, is to be understood, *vinum fulvū*, such as the Greeks call *κάρπον*; rather I imagine that wine, which *Galen* calls *λακὼν*, καὶ ὀλιγόφορον. The *sextarius* then being one pound eight ounces of cleer water, or pure wine, and sixe *sextarii* being in the *Congius*, it is most evident that the *Congius* contains ten pounds of vvater, or of wine. This also appears by a *Plebiscitum* of the two *Silii*, *Publius*, and *Marius*, which is to be seen in the best copies of <sup>c</sup> *Sextus Pompeius*.

VII. QVADRANTAL. VINI. OCTOGINTA. PONDO. SIET  
CONGIVS. VINI. DECEM. IS. SIET

SEX. SEXTARIL CONGIVS. SIET. VINI

DVO. DE. QVINQVAGINTA. SEXTARIL. QVADRANTAL. SIET. VINI  
SEXTARIVS. ÆQVVS. ÆQVO. CVM. LIBRARIO. SIET

The same is confirmed by <sup>f</sup> *Dioscorides*: who, for farther certainty, mentions with what sort of vvater vve should measure it : and that is with rain \* water, which he makes to be the most infallible of all. ὁ χροῖς τετέστι τὸ κόσμον ἔχει λι. ι. τὸ ἡμικόσμον ἔχει λι. ε. ὁ ξένης ἔχει λίτραν μίαν ἴσῃ, &c. ὁ αὐτὸς ὃ σαθμός ἐστι καὶ ὕδατος καὶ ὄξους. φασὶ ὃ τὸ ὁμβρίον ὕδατος πληρωθῆναι ἀψευδέστατον εἶναι τὸ σαθμόν, ἀγινδιὲ ὀλίγας ψκ. τ. κέν. The *Chus*, (that is, the *Congius*) contains ten pounds, the *semicongius* five, the *sextarius* one pound, and eight ounces, &c. The weight of water, and of Vinegar is the same. They say that if it be filled up with rain water, the weight will be most certain.

The

This authority of *Dioscorides*, with that other citation following out of an *Anonymous Greek Author*, strongly proves my assertion, that the *drachma Ictica* was more ponderous, then the *anarius Confutris*. For there being eighty four of proved, and ten *CCCXL. denarii* testimonies of the *Congius*, more *IDCCXX.* of necessity each particular *gius* contained that difference shew in the not any way ver then the long intended th *Cleopatra*, vs (being the drachmes of mitted in the  $\delta \delta \epsilon \angle \epsilon \eta \iota$  in weight an  $\epsilon \epsilon \delta \epsilon \delta \epsilon \epsilon \eta \iota$  d and twenty

<sup>d</sup> Agricola l 3.  
de ponder. rerū.

<sup>e</sup> Sextus Pomp  
de verb signif.

<sup>f</sup> Fragmenta  
Dioscoridis.

\* The propor-  
tion that rain  
water hath to  
fountain water  
is as 10 0000  
to 1007522, &  
the proportion  
that it hath to  
water distilled,  
is as 1000000  
to 997065, as i  
hath been ob-  
served by Snel-  
lius in Eratosth  
Bat l 2 c. 5.

Est in aquali  
mole ratio aquae  
pluviae ad dis-  
tillatam, quae-  
admodum

1000000 ad  
997065. plu-  
viae autem ad  
putealem ut  
1000 00 ad  
1007522.

\* The Congius weighs seven hundred and twenty drachmes. An *Anonymus* Greek Author, falsely reputed to be *Galen* in the edition at *Venice*, confirms the same, ἡ Παρὰ τῷ τοῖς Ἰταλοῖς ἐνρί-  
 σκεῖ) ὁ χῦς μέτρω μὲν ἔχων ξ'ς, κοτύλας ιβ'. σαθμῶν  
 τῷ ὕδατος ὀμβρίῳ, ὅπερ ὄντι ἀφ' ἡδύσατον, δραχμὰς  
 ικ'. Amongst the Romanes is found the Congius, con-  
 taining in measure six sextarii (that is) XII Cotyla:  
 but in weight, of rain water, which is most infalli-  
 ble, 1500 drachmes. And whereas *Dioscorides*  
 elsewhere writes. Τὸ κόσμιον ἔχει λίτρας θ'. τὸ ἡμι-  
 κόσμιον λ'. δ' S. ὁ ξίσκος ἔχει λ'. δ' S. The Congius hath  
 nine pounds, the semicongius four and an half, the  
 sextarius one and an half; there is no repugnan-

\* This authori-  
 ty of *Dioscori-  
 des*, with that  
 other citation  
 following out  
 of an *Anony-  
 mus* Greek Au-  
 thor, strongly  
 proves my as-  
 sertion, that  
 the drachma  
*Attica* was  
 more ponde-  
 rous, then the  
*denarius* *Consu-  
 laris*. For  
 there being  
 eighty four of

these *denarii* in the *Romane* pound, as we have elsewhere proved, and ten  
*Romane* pounds in the *Congius*, it is most evident there are 1500 *dena-  
 rii* in the whole *Congius*. Again, 1500 drachmes, by the testimonies  
 of *Dioscorides*, and this *Anonymus* writer, being equall to the *Congius*,  
 and the *Congius* being equall to 1500 *denarii*, therefore 1500  
 drachmes are equall to 1500 *denarii*, and therefore of necessity  
 every particular drachme of these, must be greater then each particular  
*denarius*. And though, according to my assertion, the *Congius* contain-  
 eth some few drachmes more then are by them assigned; yet that difference,  
 seeing it might many waies happen, as I afterwards shew in the  
 like experiments of *Villalpandus*, and *Gassendus*, it cannot any way  
 overthrow my conclusion. For the drachmes are still fewer then the  
*denarii* *Consulares*, and therefore greater: which was the thing intended  
 to be proved. And this may farther be confirmed, in that both *Cleopatra*,  
 and this *Anonymus* Author, make also the ξίσκος, or *sextarius* (being the  
 sixth part of the *Congius*) to containe an hundred twenty drachmes of  
 fountain water. Whereby it appears there is no error committed in the  
 former numbers, ὁ ξίσκος μέτρω μὲν ἔχει κοτύλας β' σαθμῶν δὲ ς' ρη'.  
 The *sextarius*, saith *Cleopatra*, contains in measure two cotyls, but in weight an  
 hundred and twenty drachmes. And the *Anonymus* writer, ὁ γὰρ δὲ ὁ ξίσκος  
 σαθμῶν δραχμὰς ρκ'. The *sextarius* contains in weight an hundred and twenty  
 drachmes. ἢ *Anonymus* *Græc.* ἢ *Fragmenta* *Dioscoridis.*

cy between this, and his former assertion. For here he speaks of the *Congius* filled with oil, and before of the same *Congius* filled with water, or wine: and that this should be but nine pounds, whereas the former is ten, is no more repugnant to reason, then it is to nature, that oil should be lighter then water, or wine: which

<sup>a</sup> *Ghetaldus* in *Archim: promod.*

<sup>b</sup> *Ghetaldus*, in his *Archimedes promotus*, hath demonstred the most accurately of any man, to be in the proportion that 1 is to 1  $\frac{1}{4}$  in respect of water, and as 1 is to 1  $\frac{1}{3}$  in respect of wine: which is almost the same with *Dioscorides*. The not observing this difference of weight, arising from the different gravity of severall liquors, in vessels of one and the same capacity, is that which hath occasioned much uncertainty, and confusion, in modern writers. And therefore we shall for farther perspicuity insert that distinction, which is often inculcated by <sup>c</sup> *Galen*, that the Romanes used two sorts of

<sup>d</sup> *Galenus* l. 1. *de comp. medicam. secundum genera.*

ounces, and pounds: and those were either *σαμιαί*, or *μετριαί*, ponderall; or mensurall: the one had respect solely to the gravity; the other to the moles, and gravity conjointly: the former were alwaies certain and fixt, consisting of solid matter: the later were *Vasa* (frequently *ἐν κέρας*) being receptacles, and measures of liquid substances: and therefore the *libra*, and *uncia mensurales*, in these vvere greater or lesse, according as the liquor to be measured vvas heavier, or lighter. Whence <sup>e</sup> *Galen* blames Physicians for not expressing this difference.

<sup>f</sup> *Li. 6. de comp. pos. medicam. sec: genera.*

*Δὲ μάταιον ἔχρην ἐπιμελέσθαι ὅ. τὰς φαρμάκων κίποι βίβλοις τὸς ἰατροὺς ὅποιαι τινὰς καλέουσι βάλλειν*

*ἔσσι*

δαί τὰς ἕξιας ἢ τὰς λίτρας τῶν ὑγρῶν φαρμακῶν, πότερον τὰς μετεγείας, ἢ τὰς καθάριας. And he gives the reason of it. <sup>1</sup> Αἱ γὰρ ὅς καθάρια τὸ βάρος ἔχουσιν ἢ σωματικῶν, αἱ δὲ μετεγεία ἢ ὄγκων. For the ponderall examine the weight of bodies, but the mensural

<sup>1</sup> Lib. 1. de compositione medicamentorum secundum genera.

the moles. But to return to the Congius, and by it to our discovery of the denarius. The water then must be naturall, either of some fountain, or of rain. For if it be artificiall, such as are made by distillations, whither by a strong reverberation, or by a gentle, in an alembick, these having somewhat of the property of fire vwill be lighter then the naturall, as <sup>m</sup> Agricola, and others observe. I shall produce two observations of the Congius vvith fountain vvater, made by two very eminent, and able men, Villalpandus, and Gassendus, the one at Rome, with the Romane weights, from the \* originall Congius it self, the other at Aix, with the Paris weights, from a model, or copy of that at Rome, procured by Peireskius. And here to compare the denarius Consularis vvith their observations, it is necessary to have exactly both the Romane, and Paris weights, The former, with as much accuratenesse, as it was

<sup>m</sup> Perinde videretur vinum hoc factitium omni nativo est levius, sic aquae ferè omnes, quae ignis calore rebus quibuscunque excoctis distillant, quas ob id distillatas appellant, ceteris aquis leviores sunt. Agricola l. 3. de pondere rerum.

\* This Congius I had weighed, if I could have procured a balance of such exactnesse, as was fitting for such

a work. The want of which occasioned Villalpandus to suspect the observation of Patus: though Patus writes thus of himself. Plenum, cum iustissima trutinâ, quâ hodie Romæ utimur cum appendissem [congiū], inveni aquam, quâ eum compleveram, libras nostri temporis novem, uncias sex semis efficere, quibus uncias quinque, drachmas quatuor, scripulum unum, & grana XIV. (quæ amplius sunt in his nostris, quam in antiquis libris computando eum congiū libras decem) & ultra scripulum unum, & grana XIV. (de quibus nullam rationem habendam esse judicavi) ex antiquis libris prædictis pendere inveni. But Villalpandus trying it long after Patus, with more care, and with a balance made of purpose, found it to be exactly ten such pounds, as are now used in Rome. All that I could doe was to fill the capacity of it with

miliū

*milium* well cleansed, and to compare it with the English measures taken from the Standards. It contained of our measures for wine three quarts, one pint, and one eighth part of a pint. Of our corn, or dry measures, three quarts and about one sixth part of a pint. At my being in Italy, there was found amongst the ruines at Rome a *Semicongius* in brass, of the same figure with this of *Vespasians*, the sides much consumed by rust. This I also measured, and found it to be the half of *Vespasians' Congius*. From this measure of the *Congius* we may rightly apprehend how vast that draught was of *Novellus Torquatus*, who drank three of these *Congii* at once: from whence he was called *Novellus Tricongius*. The story is recited by *Pliny* [l. 14. c. 22.] *Apud nos cognomen etiam Novellus Torquatus Mediolanensis ad Proconsulatum usque è praturâ honoribus gestis, tribus congiis (unde cognomen illi fuit) epotis uno impetu, spectante miraculi gratiâ Tiberio principe in senectâ jam severo, atque etiam aliâ sævo, sed ipsâ juventâ ad merum prior fuerat.* In the same chapter *Pliny* likewise discourseth thus of *Cicero*, *bonne to that famous Oratour. Tergilla Ciceronem Marci filium binos congios simul haurire solitum ipsi objicit, Marcoque Agrippæ à temulentis scyphum impatitum.*

possible, were taken in Rome. The other were sent me by *Monsieur Hardy*, a learned man of honourable quality in Paris, who compared them with the Standard. To begin with that of *Villalpandus*, who gives us a large description, with how much caution, and circumspection, and with how exquisite a balance he twice made his experiment, whereby he discovered the weight of it in water to be exactly answerable to ten such pounds, as are now used in Rome: Whence he concludes, *Constanter asserimus antiquam Romanorum libram, unciam, ac pondera, tot ætatum successione, ac Romani imperii perturbationibus minimè immutata fuisse, sed eadem per manus tradita usque ad nostra tempora perdurasse.* This Roman pound of his reduced to the English Standard for silver, or Troy

<sup>a</sup> *Villalpandus*  
l. 2. disp. 2. c. 11.  
de apparatu  
Vrbis ac Tem-  
pli.



Troy vveight, vvith vvhich I have faithfully col-  
lated it, is 5256 grains English, such as the  
Troy pound is 5760: the whole *Congius* there-  
fore confisting of ten pounds, will be 52560 Eng-  
lish grains. The other observation is related  
by ° *Gassendus*, in his elegant discourse *de vitâ* ° *Gassendus in*  
*Peireskji. Vt paucis ergo res dicatur, cautiones vitâ Peireskji.*  
*adhibuimus easdem, quas Lucas Patus, & Villal-*  
*pandus, dum vas ipsum, ad summum collum pute-*  
*ali aquâ opplevimus, expendimus, vasis pondus*  
*subduximus. Deprehendimus autem aquam, qua*  
*Romano pondere esse debuit decem librarum, seu*  
*unciarum centum viginti, esse pondere Parisiensi*  
*(quale nempe Parisiis exploratum, missumque est)*  
*librarum septem, minus uncia quadrante: seu*  
*unciarum centum undecim, & quadrantum uncia*  
*trium. Deinde ex hac proportionem collegimus unci-*  
*am Romanam continere grana quingenta, & tri-*  
*ginta sex, qualium quingenta septuaginta sex in*  
*Parisiensi continentur: unde & illis in drachmas*  
*collectis, obvenere cuilibet drachmæ grana sexa-*  
*ginta septem: idque proinde censuimus pondus*  
*denarii Casarei, quem dictum est fuisse \* drachma-*  
*lem.* Now the Paris ounce sent to me by *Mon-*  
*seudus* I easily grant, that the  
denarius under some of the *Cæsars* was *drachmatis*, that is, the eighth part  
of the Romane ounce. But neither was it alwaies so under the *Cæsars*, nor  
if it had been so, will it therefore follow that it was *drachmatis*, or the eighth  
part in respect of the Attick ounce. Seeing the Athenian ounce was grea-  
ter then the Romane, as we have before proved; and therefore the *Denari-*  
*us Consularis*, which was the seventh part of the Romane ounce, was scarce  
the eighth part of the Attick. Wherefore he must see how he can make it  
good, where he brings *Peireskji* in the second book of his life thus dis-  
counting -- *Denarium, cum tempore Regum pependisset trientem uncia, sub an-*  
*tiquâ tamen Rep. pependisse solum sextantem, sub recentiore partem septimam,*  
*sub primis Cæsaribus octavam, seu drachmam (Atticæ nempe drachmæ æ-*  
*qualm.)*  
sieur

\* The infe-  
rence of *Gas-*  
*sendus* I easily  
grant, that the

*fiens Hardy*, containing four hundred seventy two grains English, and an half, and the *Congius*, according to *Gassendus*, of the *Paris* ounces  $111\frac{1}{4}$ , the compleat weight of the *Congius* in grains will be  $52801\frac{1}{2}$ . Which sum exceeds that of *Villalpandus* by  $241\frac{1}{2}$ , that is, by more then half a *Romane* ounce. This difference (though it is not great) between these two observations of theirs might arise, either from the unequall swelling of the water in the *Congius*: or from the different gravity of fountain water at *Rome*, and at *Aix*: or from some inequality of the model, and Originall: or from some defect in the *jugum*, or beam of the balance, vvhich if it vv ere not made by a very skilfull hand, by the pressure of so great a weight, would suffer some alteration. Which vv ay soever it vv as, either by some, or all of these, the difference cannot prejudice my conclusion a compleat grain: vv hich no reasonable man but will allow, either for coining, or for walt. For if I divide  $52560$ , the number of the grains in the *Congius*, according to *Villalpandus*, by  $15CCCXL$ . the number of the *denarii* in ten pounds, the sum will be  $LXII.\frac{4}{7}$ . Or if we shall follow *Gassendus*, though I should rather prefer *Villalpandus*, because he took his immediately from the originall, then vv ill the weight of the *denarius Consularis* be  $LXII.\frac{361}{476}$ . The fraction in both without any inconvenience may be omitted. And this proportion of the weight of the *denarius Consularis*, if it were necessary, I could farther prove by some of the *aurei Consulares*, which often were double in weight to the *denarii*, as the

ἑρ χρυσὶ Ἀλίνῃ were double to the δραχμῇ  
 ἀργεῖς; as also by severall *quinarii* in silver  
 (which are the half of the *denarii*) by a very an-  
 cient, and perfect \* *semuncia*, by a *quadrans*, and  
*triens*, all of them in brasse of mine own, and  
 by severall other weights examined abroad. One  
 of the I cannot pretermit, being neer five Roman  
 pounds, and very remarkable for this inscripti-  
 on. EX. AUCTORITATE. Q. JUNI. RU-  
 STICI. PR. VR but the weight of it is a li-  
 ttle defective; part of the *filix* (as many of the  
 ancient Romane weights, that I have seen, were  
 \* *ex filice*, which is as hard, or harder the marble)  
 being broken away, else the rest is very intire, and  
 well polished. But I conceive that, by those  
 former waies, I have so irrefragably demonstra-  
 red the true ponderousnesse of the *denarius*  
*Consularis*, that it would be thought superflu-  
 ous, or a vain ostentation, to endeavour any far-  
 ther to prove it. Wherefore in stead of that  
 I shall handle the *denarius Casareus*, which is  
 our second inquiry.

The *denarius Casareus*, was that which was  
 made under the government of the *Casars*. And  
 this in stead of the face, and inscription *ROMA*,  
 with the character X or *Ξ* on the fore part,  
 and the impresse of the *biga*, or *quadriga*, on  
 the reverse, (in which kind most of the *denarii*  
*Consulares* were stamped) had on the reverse se-  
 verall impresses, and on the other side the image,  
 or resemblance of the Emperour: which occa-  
 sioned our Saviour to ask the question, when a  
*σκληρον*, or Romane penny, was shewed to him:

\* whose is this image, and superscription? They say

unto

\* Of these Ro-  
 mane *Semun-  
 cia*, I have  
 bought, and  
 seen severall in  
 brasse. Besides  
 one, which I  
 owe to my very  
 worthy, and  
 learned friend  
 D<sup>r</sup> Ent.

\* *Patus l. i. de  
 antiq. Rom. &  
 Græc. interv.  
 mensuris*,  
 makes mention  
 of a *libra Ro-  
 mana* in brasse  
 procured by  
*Fulvius Vrsi-  
 nus*, of singular  
 rarity: in *cujus  
 supremâ plani-  
 tie argenteis li-  
 teris hæc erat  
 nota I, & in  
 circumferentiâ  
 hæc alia EX.  
 AVC. D. CAES*  
 but this I had  
 not the happi-  
 nesse to see in  
 Italy.

\* Matth. 22. 20.

unto him *Casars*'. This *denarius Casareus*, it wont respect some definitive quantity, and weight, was as various, and uncertain, as the *denarius Consularis* of the later Consuls was constant, and fixt: being under the first Emperours, sometimes more, sometimes lesse, as the reasons, and exigencies of the State did require, or the profusenesse, and prodigality of those times. Yet this uncertainty (as far as I have observed) was limited within some certain, and determinate bounds: the *denarius Casareus* never exceeding the seventh part of the Romane ounce, and never being lesse then the eighth part, but often in a middle proportion between both, and that with much inequality. And this made <sup>b</sup> *Villalpandus*, after many experiments at Rome, to conclude, that out of the *denarii* nothing concerning the Romane weights could be determined. Though *Portius*, *Agricola*, *Ciaconius*, *Snellius*, and severall others, before, and after him, are of a contrary opinion. And it may be, if *Villalpandus* had distinguished between the difference of times, and in them of the different coins, and considered those of the Consuls, distinctly from those of the *Casars*, and those of the former *Casars*, from those of the later, he would have reformed his judgment. For it plainly appears, upon examination, that the diminution of their weight was an invention introduced after *Antonius* the Triumvirs' time, whereas before the *denarius* was fixt. *Miscuit*, saith

<sup>c</sup> *Plin. l. 33. c. 9.* *Pliny, denario Triumvir Antonius ferrum, alii è pondere subtrahunt* (his meaning is under the Emperours, to *Vespasians*', or his own [time] *cum sit*

<sup>b</sup> *Villalpandus*  
de apparatu  
Vrbis ac Tem-  
pli par. 2. l. 2.  
disp. 2. c. 13.

<sup>c</sup> *Plin. l. 33. c. 9.*

*fit justum octoginta quatuor è libris signari.* Where he saies very well in speaking so generally, *alii è pondere subtrahunt*, without precisely limiting the proportion. For this, as we observed, was very various, and undeterminate: so that whereas the just number of the *denarii*, according to the practise of the later Consuls, should bee eighty four in the Romane pound, we finde by the weight of the best of them under the former *Cæsars*, that they coined sometimes eighty sixe, eighty eight, &c. till at last there came to be ninety six *denarii* in the Romane pound, that is, eight in the ounce. And this, by a very necessary consequence, may be inferred out of another place of *Pliny*, if we take for granted, what some learned Moderns confesse, and the gold and silver coins found to this day, of the later Consuls, and first Emperours, strongly prove, that as the Atticks made their χρυσός, or *aureus*, double in weight to the δραχμὴ ἀργυρεῖς: so did the Romanes make their *aureus* double in weight to the *denarius*. Which proportion they might borrow from the *Athenians*, and other *Grecians*, who, as *Arias Montanus* imagines, first received it from the practise of the *Hebrews*: or rather, as I suppose, from the *Phenicians*, and these from the *Hebrews*. From whencesoever it came, it is not much materiall in our inquiry: that which we may safely conclude from thence is this, that the gold being, in respect of weight, double to the silver, the *aureus Romanus* falling in its weight, the *denarius* likewise of necessity must fall: else could they not have continued in *duplâ ratione*. Now in

<sup>d</sup> *Arias Montanus* in *Thubal Cain, sive de mensuris*.

H

what

Plin. l. 3. c. 33.

what manner the aureus was first coined, and how afterwards it lost of its primitive weight, Pliny informs us. *Aureus nummus, post annum LXII. percussus est, quam argenteus, ita ut scrupulum valeret sestertius vicenis, quod efficit in libras ratione sestertiorum, qui tunc erant, sestertios ICCCC.* Post hac placuit XL.M. signari ex auri libris: paulatimque principes imminuere pondus, imminuisse vero ad XLV.M. For this testimony, and the former, we are to thank Pliny, seeing there is neither Greek, nor Latine Author extant, from his time to Theodosius, that gives us any certainty, what to conclude concerning the ancient coins. And therefore since this later is of great consequence, but somewhat corrupted, I compared it with the MSS. in the Vatican, and Florentine Libraries, and with a fair one in Baliol College, which renders the later part of it thus. *Postea placuit X.XL. signari ex auri libris, paulatimque principes imminuere pondus, imminuisse vero ad XLVIII,* vvhhere for XLVIII. <sup>f</sup> Villalpandus corrects, or rather corrupts, the text, in writing XLV. But Agricola, and <sup>g</sup> Snellius read it by conjecture thus. *Post hac placuit XLII. signari ex auri libris, paulatimque principes imminuere pondus, minutissime vero ad XLVIII.* And <sup>h</sup> Snellius gives a reason of it in his Eratosthenes Batavus. *Nam ita argentei denarii, & aurei nummi eadem manet analogia, pondere subduplo, ut quamdiu octoginta quatuor argentei è libra, & è singulis uncis septem cudebantur, tam diu quoque aurei duo & quadraginta libram implerent. Postquam vero argentei nummi pondus imminutum est:*

<sup>f</sup> Villalp. de ap-  
par. Urbis ac  
Templi. par. 2.  
l. 2. disp. 2. c. 12  
<sup>g</sup> Snell. in Era-  
tosth. Batavo.  
l. 1. c. 5.  
<sup>h</sup> Ibidem.

*est: ut sex & nonaginta in libram constituerentur, tum quoque duo de quinquaginta aurei, pondere tanto leviores, in singulis libris cudi cœperunt.* Which conjecture seems not altogether improbable, if we respect the later Consuls, and first *Cæsars*, in whose times we finde the *aurei* to have been double to the *denarii Cæsarei*; but surely long before *Iustinian*, the *aurei*, or as they were then also called the *solidi*, lost that proportion to the silver, and kept it onely to the *semisses aurei*, to which they were double, as they were in a treble proportion to the *tremisses*.

Wherefore in stead of these conjectures (which have been the bane of many a good Authour) of *Agricola*, *Villalpandus*, and *Snellius*, I would read the later part of those words of *Pliny*, as the *MSS.* doe, till I can see some concluding reason, or good authority of ancient Authors to the contrary. For I doe not see why the Romans at the first might not coin forty *aurei* out of the *libra*, as well as forty silver *teruncii* out of the *denarius*: which *Varro* assures us: *Varro l. 4. de* they did. And who knows whither at the first *L. Latin.* making of their gold coins, which was sixty two years, according to *Pliny*, after the first coining of silver, they endeavoured to keep them in *duplâ ratione*, in respect of weight: which gracefull manner they might afterwards introduce by commerce with the Grecians.

And here, ere I proceed any farther in my inquiry after the *Denarius Cæsareus*, I cannot but complain, either of the negligence of former times, or unhappinesse of ours: in that not

<sup>k</sup> Xiphilinus in  
Anton. Caracalla.

one Authour extant mentions the true weight of the *denarii*, under the *Cæsars*. <sup>k</sup> Xiphilinus relates in his epitome of *Dio*, how *Antoninus Caracalla* corrupted, & abased the coins; but makes no mention of the weight. Τῷ ἔν Ἀντωνίνῳ, τὰτε ἄλλα

καὶ τὸ νόμισμα κίβδηλον ἦν, τὸ δὲ ἀργύριον καὶ τὸ χρυσίον, ὃ παρῆχεν ἡμῖν, τὸ μὲν ἐκ μαλίσθαι καταργυρέμενον, τὸ δὲ καὶ ἐκ χαλκοῦ καταχρυσύμενον ἐσκαδάζετο. To *Antoninus*, as other things, so also his money was adulterated. For the silver & gold, which he gave us, the one was prepared of lead silvered over, and the other of

<sup>l</sup> Suidas in voce  
Μον. Τεχνίται five  
Μονητάριοι.

brasse guilt. <sup>l</sup> Suidas also speaking of the *monetarii* writes thus. Μονητάριοι οἱ περὶ τὸ νόμισμα τεχνίται, οἱ δὲ πρὸς Αὐρηλιανῷ διέφθισαν τὸ νόμισμα, καὶ τὸ ἴδιον ἀρχόντα Φιλικήσιμον ἀνελόντες ἐμφύλιον ἐγείρουσι πόλεμον, ὃς μόλις Αὐρηλιανὸς χειρωσάμενος καταβάλλει κολάσων ὀμότητι κατεργάσαστο. The *Monetarii* are Artizans employed in the making of money. These in *Aurelianus* time corrupted the money, and, having slain their Governour *Felicissimus*, raised a civill warre: whom *Aurelianus* with much difficulty conquering, put to death with exquisite torments. And many good laws were made, by severall Emperours, against adulterating, and corrupting of coins: and those executed with much severity, even in the time of Christianity. For we finde under the Emperour *Constantine*, that such as offended in this kinde, were not onely put to death, but to a cruell, and bitter death by fire. L. OMNES SOLIDI. C. THEOD. SI QVIS SOLIDI CIRCULVM EXTERIOREM INCIDERIT, VEL ADULTERATVM IN VENDENDO SVBIECERIT. Omnes solidi, in quibus



bus nostri vultus, ac veneratio una est, uno pretio aestimandi sunt, atque vendendi, quanquam diversa forma mensura sit: quod si quis aliter fecerit, aut capite puniri debet, aut flammis tradi, vel aliâ pœnâ mortiferâ. Quod ille etiam patietur, qui mensuram circuli exterioris adraferit, ut ponderis minuat quantitatem, vel figuratum solidum, adulterâ imitatione, in vendendo subjecerit. In Constantinus' time the same punishment was inflicted. *L. PRÆMIO. C. THEOD. DE FALSA MONETA*, Præmio accusatoribus proposito, quicunque solidorum adulter potuerit reperiri, vel à quoquam fuerit publicatus, illico omni dilatione submotâ flammarum exustionibus mancipetur. And afterwards under Valentinianus, Theodosius, and Arcadius, they were accounted, and suffered as *rei læsæ Majestatis*. *L. FALSAE MONETÆ. COD. EODEM*, Falsa moneta rei, quos vulgò parachaetas vocant, Majestatis crimine tenentur obnoxii. But no where is it mentioned concerning the *denarii*, and *quinarii*, which were the silver coins, in common use, how much should be their weight. Wherefore in such a silence of ancient Authors, we have no more solid, and sure foundation of our inquiry: then either by our selves to examine the weight of the fairest coins under the Emperours: or else to relate, what others long before our time have observed. *Antonius Augustinus* in generall informs us, when coins were at their highest perfection; and how they began to decline with the Romane Empire: as commonly when money comes to be abused, and that the mint, like the pulse, beats too slowly, and

irregularly, it is an evident symptome of some distempers in the bowels of a State °. \* The medailes of all times (saith he) [are worthy to be observed by Artizans] beginning from Alexander the great, in whose time they principally flourished, till the Emperour Gallienus, when they chiefly fell together with the Empire. From thence to the end of Iustinian, there are found good medailes of all the Emperours, but with a notable diminution of their politenes, and ancient perfection. Those which we have after Iustinian, are insufferably bad. The fault by all men is assigned to the Huns, and Vandals, and Alanes, and Goths, and Longobards, and to other barbarous, and savage Nations, who conquered the greatest part of Europe. Erizzo, who lived almost an hundred years since, a very diligent man in the Romane coins, but it is to be wished that he had used more judgment in the explication of them, more particularly informs us. \* P Having compared the weight of those sorts of mony, which are equall in weight to the Romane denarius, with the medailes of silver, which have the heads of the Romane Emperours imprinted, I have found them not a litle different, so that as it were all those medailes weigh lesse then the denarius. And duppo Giustimiano, è tanto cattivo che non si può soffrire. Et se ne dà quasi da oguano la colpa à gli Vnghi, à i Vandali, à gli Alani, à i Goti, à i Longobardi, & ad altre barbare, & s'immagina, che s'ignoragiarono gran parte d'Europa. Ant. August. dialog 1. P. Havendo io tali monete le quali sono del peso di un denario Rom pareggiate di peso alle medaglie di argento, che hanno scolpite le teste de i Principi Romani, le ho ritrovate differenti non poco del peso, sì che quelle medaglie pesano quasi tutte meno del Denario, & habendo ancora pesate quelle medaglie che hanno scolpita la effigie de i Cesari, le ho sempre ritrovate differenti fra loro nel peso. Erizzo.

having

having also weighed those medailes which have the effigies of the Casars, I have continually found them different amongst themselves in weight. This uncertainty so troubled Villalpandus, after many experiments made at Rome, that he knew not what to determine. And it seems <sup>9</sup> Blondus long before conceived it impossible. *Hec omnia qualia per singulas aetates fuerint, examissima ostendere; non magis difficile, quam impossibile fuerit; non solum quia obscuris, & nostra aetate ignotis verbis sunt à majoribus tradita; sed quia omnis ferè aetas suam habuit cundendi varietatem, & formam.* Wherefore, for farther satisfaction of the Reader, I shall relate some observations of mine own: especially those of the twelve first Casars; which I took, with many others, by an accurate balance, from some choice cabinets in Italy. And first, I shall begin with the gold coins. For seeing the *aurei* under the former Casars were in *dupla ratione* to the *denarii*, therefore the weight of those being known, we cannot be ignorant of the weight of the *denarii Casarei*. Besides, they are not subject to be consumed by time, and rust, but onely *ex intertrimento*, and therefore we may the safest give credit to them. And lastly, because the difference, though but of a grain, is of some consideration in gold, the Masters of the Mint use to be the more circumspect about them: whereas in silver coins, since it is hardly worth the pains to stand precisely upon the excess, or defect of every grain, therefore there are few of these so exact, but either exceed, or want, in the very mint, one

<sup>9</sup> Blondus l. 5.  
de Roma triumph.

or two graines, and sometimes more.

*The weight of some aurei under the first twelve Cæsars.*

	Eng: grains.
* C. CAES. COS. III.—	CXXIII $\frac{7}{12}$
* <i>A second, on the reverse, A. HIR-</i> <i>TIVS. PR</i> —	CXXII $\frac{1}{4}$
* <i>A third</i> —	CXXIV $\frac{1}{4}$
AVGVSTVS. CAESAR. III. VIR—	CXIX $\frac{1}{2}$
<i>A second, on the reverse, OB CI-</i> <i>VES SERVATOS</i> —	CXIX $\frac{1}{2}$
* <i>A third, on the reverse, DIVOS.</i> <i>AVG. DIVI. F</i> —	CXIX
TIBERIVS—	CXVIII $\frac{1}{4}$
* <i>A second</i> { <i>On the forepart</i> TI. CAESAR. DIVI. AVG. F. AVGV- STVS <i>On the reverse, a temple</i>	CXVII $\frac{1}{2}$
CALIGVLA—	
CLAVDIVS, <i>on the reverse, S. P. Q. R.</i> OB. CIVES. SERVATOS—	CXVII
<i>A second</i> —	CXVII $\frac{1}{2}$
<i>A third</i> —	CXVIII $\frac{1}{2}$
* NERO, <i>on the reverse, SALVS</i> —	CXVI
* <i>A second, on the reverse, JVPPI-</i> <i>TER. CVSTOS</i> —	CXIII $\frac{1}{2}$
* <i>A third, on the reverse, CON-</i> <i>CORDIA. AVGVSTA</i> —	CXIII
GALBA, <i>on the reverse, CONCOR-</i> <i>DIA. PROVINCIARVM</i> —	CXV
OTHO—	

OTHO, on the reverse, SECVRITAS	
S.P.Q.R.— — — — —	CVIII $\frac{1}{4}$
VITELLIVS, on the reverse, LIBER-	
TAS. RESTITVTA — — — —	CXII $\frac{1}{4}$
VESPASIANVS, on the reverse,	
PACI AVGVSTI — — — —	CXI
* A second, on the reverse, COS. III	
TR. POT.	CXIV $\frac{1}{4}$
A third, on the reverse, PONT.	
MAX. TR. P. COS. VI — — — —	CXI
* A fourth, on the reverse, PACI,	
AVGVSTI — — — — —	CVIII $\frac{3}{4}$
A fifth, on the reverse, PACI.	
AVGVSTI — — — — —	CX
* T. VESPASIANVS, on the reverse,	
ANNOA. AVG — — — — —	CIX $\frac{1}{4}$
* DOMITIANVS. COS. II. — — — —	CXIII
* A second, DOMITIANVS. COS.	
VI. CAESAR. AUG. F. on	
the reverse, IVVENTVTIS.	
PRINCEPS — — — — —	CXII $\frac{1}{4}$

These aurei were selected by me, out of severall others, as the fairest and intirest; and amongst these to such as I have prefixed an asterisc, they are such as seemed so perfect, that I could make no just objections against them. By these it appears that *Pliny*, speaking of the gold coins, *Plin. l. 33. c. 3.* rightly informs us. *Paulatimq; Principes imminuere pondus, imminuisse vero ad XLVIII.* That by degrees the Emperors lessened the weight [of the aurei] to the forty eighth part of the Roman pound; that is, to the fourth part of the ounce. For this

is



is the lowest weight, that I find, till *Heliogabalus* time, who coined new sorts of *aurei*, different from what had been the constant practise of the *Romane State*: some of which were the fiftieth part of the *libra Romana*, and others again so massy, that they were *centeni*, or *bilibres*; which not long after were altered, and abolished, by *Alexander Severus*. The manner is expressed by

† *Lampridius in*  
*Alex: Severo.*

† *Ælius Lampridius*, in the life of *Alex: Severus*. *Formas binarias, ternarias, & quaternarias, & denarias etiam, atque amplius, usque ad bilibres quoque, & centenar, quas Heliogabalus invenerat, resolvere præcepit; nec in usu cuiusquam versari, atque ex eo his materia nomen inditum est, cum diceret plus largiendi hanc esse Imperatori causam, si cum multis solidos minores dare posset, dans decem vel amplius unâ formâ, triginta, & quinquaginta, & centum dare cogeretur.* Under the same *Alex: Severus* began the *semisses aureorum*, and *tremisses* to be coined, which had not formerly been in use. The *semisses* were answerable in weight to the *denarii Casarei*, when they were least, that is, ninety six in the *Romane pound*; though *Agricola*, *Villalpandus*, and others, upon a mistake, equall them then to the

† *Lampridius in*  
*Alex: Severo.*

*drachma Attica.* † *Ælius Lampridius* writing of *Alex: Severus*, plainly expresses that in his time they began. *Tumq; primum semisses aureorum formati sunt, tunc etiam, cum ad tertiam partem aurei redigal decidisset, tremisses; dicente Alexandro etiam quaternarios futuros, quod minus non posset.* Afterwards, *Constantine*, *Constantinus*, *Julian*, & other succeeding Emperours, lessened the weight of the *aurei*, whereby there came to be seventy two in the

the Romane pound, so that each of them weighed the *sextula*, or four *scrupula*. That the *aurei* of *Constantine's* time were sixty two in the Romane pound, is most evident out of the *Codex Theodosianus*, where they are also absolutely called *Solidi*, without the addition of *aurei*.

*L. SI QVIS. C. THEOD. DE PONDERA-* *Codex Theo-*  
*TORIBVS, ET AVRI INLATIONE. Siquis* *dos. l. 1. de*  
*solidos appendere voluerit auri cocti, septem soli-* *ponderatoribus!*  
*dos quaternorum scripulorum, nostris vñtribus fi-*  
*guratos, adpendat pro singulis unciiis. XIV. verò pro*  
*duabus, juxta hanc formam omnem summam de-*  
*biri inlaturus: eadem ratione servandà, etsi ma-*  
*teriam quis inferat, ut solidos dedisse videatur.*

\* *Pancirollus*, in his *thesaurus variarum lectio-*  
*num utrùsque juris*, reads *VI. solidos*, instead of  
*VII. and XII. instead of XIV.* And that it  
must necessarily be so, besides that the *solidi* of  
*Constantine* now extant prove as much, may  
bee collected out of the proportion of weight,  
vvhich is here assigned by *Constantine* himself  
to the *solidi*, and that is four scruples, or the  
*sextula*. For the *solidus* containing four scru-  
ples, and the ounce containing twenty four  
scruples, there will therefore be sixe *solidi* in  
the ounce; againe, the pound consisting of  
twelve ounces, and the ounce of sixe *solidi*, the  
whole pound therefore will consist of seventy  
two *solidi*. These *aurei* by *Iustinian* in like manner  
are termed *solidi*. *L. QVOTIESCVNQVE. C.*  
*DE SVSCEPTORIBVS, PRÆPOSITIS, ET*  
*ARCARIIS.* Where he also defines the same

\* *Gui. Panci-*  
*rolli thesaur.*  
*var. lect. utr.*  
*juris.*

weight. \* *Quotiescunque certa summa solidorum*  
*pro tituli qualitate debetur, & auri massa trans-*  
*mittitur;*

\* *Cod. lib. 10. tit.*  
*70. in rescripto*  
*Valentiniani &*  
*Valentis Impp.*

\* This excellent place very hardly escaped *Haloanders'* commendation, who had a great minde to have played the Critick, and to have altered it. For he thus writes. *In vetusto codice in rasam membranam hac ita reposita sunt, ut certum sit alteram, & fortasse genuinam lectionem sublatam, & legendum, duodequingenta, aut certe quingenta.* A goodly consequence, because the parchment was scraped, & the first writing altered, therefore the true reading must be expunged.

and a false one put in: whereas he might with more candor, and ingenuity, have concluded the contrary, that the false one was expunged by the scribe, and the true one inferred. For who uses in copying of MSS. to scrape any thing out of the *apographum*, but only when by collating it he findes it to be different from the Originall?

*notarum.*

\* *Zonar. l. 3.*

\* *Isidorus l. 16. Orig. c. 24.*

*mittitur, \* in LXXII, solidos libra feratur accepta.* The same thing is implicitly confirmed by *Isidorus* (l. 16. Orig. c. 24.) *Solidus alio nomine sextula dicitur, quod is sex uncia compleatur. Hunc ut diximus, vulgus aureum solidum vocat, cujus tertiam partem ideo dixerunt tremissem, quod solidum faciat ter missus.* Where *Aglicola*, I imagine, truly findes fault with him for calling the *solidus*, *sextula*; though the proportion he assigns is right, that is, that the *solidus* was the sixth part of the Romane ounce, and contained *ἑξάκις σαθρόν*, the weight of the *sextula*, as it is attested by \* *Zonaras*: or, which is all one, that seventy two *solidi* were made out of a Romane pound, as *Iustinian* before expressly assigned; and as infinite store of the *solidi*, or *aurei*, from *Constantine* to *Focas*, which I have weighed, manifestly prove,

In the same place of \* *Isidorus* we may collect the reason, why the *aureus* was called *solidus*. After that, the *semisses*, and *tremisses aurei* were coined, the *aureus* was called *solidus*, because nothing was wanting to it: *Solidum enim Antiqui integrum dicebant, & totum*: In which sense the *solidus* was also taken for the *libra*, or *assis*; that is, as the *assis* is taken for the whole, according to that usuall phrase of *Civi-*



lians *ex asse habes*, when one is heir to the whole inheritance : so the *solidus* was taken for the whole *assis*. <sup>b</sup> *Volusius Metianus*. *Prima divisio solidi*, id est *libra quod as vocatur*, in duas partes dimidias deducitur. From hence (saith <sup>c</sup> *Salmasius*) the Romanes called that the *solidus aureus*, when it had the same weight in gold, which the *solidus*; that is, the *assis* had in respect of *brasse*, that is, two drachmes. Though I rather suppose that the *aureus* was called *solidus*, first of all in *Severus'* time, not for containing two *denarii* in weight, (which *Salmasius* calls drachmes). for so it alwaies did under the later Consuls, and first Emperours, but because the *aureus* was then first divided into two parts, that is, into the *semisses*, and *tremisses*, and so relatively to these the whole *aureus* was rightly called *solidus*. Of the same opinion is <sup>d</sup> *Agricola*. *Quos aureos, cum respectum ad semisses & tremisses haberent, tunc primo dixerunt solidos, quod semisses ex dimidia eorum parte, tremisses ex tertia constarent.*

<sup>b</sup> *Vol. Metianus de assis distrib.*

<sup>c</sup> *Hinc & solidum aureum dixere Romani, ubi idem pondus habere cepit in auro, quod solidus, id est, as haberet in ere. duarum nempe drachmarum. Salmas. de modo vsur.*

<sup>d</sup> *Agricola l. 2. de pond. & temp. monetarum.*

The *semisses*, and *tremisses*, of the other Emperours, at some distance after *Severus*, came to be lesse in the same proportion, as the *aurei* were lessened. For the *aurei* of *Severus* were double to the *denarii Cesarei*, and therefore but forty eight in the pound, and not fifty as *Helio-gabalus* made, whose errour *Severus* corrected. But when the later Emperours made seventy two *aurei* out of the *Romane* pound, the *semisses* came also to be diminished, and were half of these new *aurei*, and not of the former, and the *tremisses* the third part. And here the *aurei* lost that proportion, which they kept before of being

\* I have since perused another *tremissis* in gold, a very fair one, with this inscription D.N. JUSTINUS. P.F.

AUG. weighing twenty two grains and better; which formerly belonged to the learned Geographer *Ortelius*. Besides a third, of *Majorianus* with CONOB superscribed (which signifies *Constantinopolitanum obvixum* or *Constantinopoli ob-signatum*) weighing likewise twenty two grains. And a fourth, of *Iustinian*, weighing twenty three.

ing double to the *denarii*. Of these *tremisses* is *Iustinian* to be understood, *L. FORTISS. MILITIBVS. COD. DE MILITARI VESTE* *Fortissimia militibus nostris per Illyricum non binos tremisses pro singulis clamydibus, sed singulos solidos dari precipimus*. And this may be farther proved by a fair \* *tremissis* in gold of mine own of *Iustinian*, with the inscription D.N. JUSTINIANUS, weighing twenty one grains English, and therefore wanting onely three grains  $\frac{1}{5}$ , which it may have lost by time : otherwise it would be exactly the  $216^{\text{th}}$  part of the Roman pound, that is, the third part of the *aureus*, or *solidus* of those times : whereas if it had been coined to the proportion of the *aureus*, when there were forty eight in the pound, it should have weighed 36 grains  $\frac{1}{2}$ , so that it must have lost  $15 \frac{1}{2}$ , a difference so great, in a peece of gold so fair, and withall of so small a quantity, altogether improbable. And therefore this coin alone, if no more were extant, would confute their opinion, who maintain, that the *tremissis* of *Iustinian* differed not from the *tremissis* of *Severus*, and consequently the *aurei* of them both, better then the reasons produced by <sup>b</sup> *Covarruvias* to the contrary have done.

<sup>b</sup> *Covarruvias* tom. 1. c. 3. paragr. 1. & 2. de vet. aureis, & argenteis numis.

The weight of some of the fairest Aurei of the  
Romane Emperours, from Nerva  
to Heraclius.

On the fore part of the Aurei  
are these characters.

IMP. NERVA. CAES. AVG. P.M.  
TR. P. II. COS. III. P. P.  
IMP. TRAIANVS. AVG. GER.  
DAC. P. M. TR. P. COS. VI. P. P.  
IMP. CAESAR. TRAIAN. HA-  
DRIANVS. AVG.  
ANTONINVS. AVG. PIVS. P. P.  
TR. P. XII.

ANTONINVS. AVG. ARME-  
NIACVS

IMP. CAES. L. AVREL. VERVS.  
AVG

L. VERVS. AVG. ARM. PARTHI.  
MAX

M. COMM. ANT. P. FEL. AVG.  
P. P

SEVER. P. AVG. P. M. TR. P. X.  
COS. III

IMP. M. ANT. GORDIANVS.  
AFR. AVG

\* Trebonianus Gallus

\* Gallienus

IMP. PROBVS. P. F. AVG

IMP. C. CARINVS. P. F. AVG  
DIOCLETIANVS. P. F. AVG

On the reverse these.

Eng: grains.

FIDES. EXERCITVS— 111  $\frac{1}{2}$

DIVVS. PATER. TRAL-  
ANI— 110  $\frac{1}{2}$

COS. II. P. M. TR. P.  
P. AVG— 121  $\frac{1}{2}$

COS. III— 119  $\frac{1}{2}$

P. M. TR. P. XVIII. IMP.  
II. COS. III. in Scuto  
Victoria. VIC. AVG— 118  $\frac{1}{2}$

CONCORDIAE. AV-  
GVSTOR— 117  $\frac{3}{4}$

TR. P. II. COS. II  
TR. P. V. IMP. III. COS.  
II— 113  $\frac{1}{2}$

IOVI. VLTORI— 114

FELICITAS. SAECVLI— 114  $\frac{1}{2}$

CAESAR. M. ANT.  
GORDIANVS. AFR.  
AUG— 114

P. M. TR. P. III. COS. II.  
P. P— 75  $\frac{3}{4}$

P. M. TR. P. III. COS. P. P.  
VICTORIOSO. SEM-  
PER— 74  $\frac{1}{2}$

SPES. AVGG— 105

IOVI. CONSERVAT.  
AVGG— 72  $\frac{1}{2}$

AVGG— 77  $\frac{1}{2}$

MAX

... MAXIMIANVS.	VIRTVS. MILITVM. T.	74 $\frac{3}{4}$
CONSTANTINVS. MAX. AVG	SECVRITAS. REIPVBLI-	70 $\frac{1}{2}$
	CAE	
	<i>infra</i> TR	
CONSTANTINVS. P. F. AVG.	VIRTVS. AVGVSTI. N.	68
CONSTANTIVS	GLORIA. REIPUBLICAE	
	VOT XXX. MVLTIS.	
	XXXX. <i>infra</i> SNNS.	70
IM. CAE. MAGNENTIVS. AVG	VICTORIA. AVG. LIB.	
	ROMANOR	70 $\frac{1}{4}$
	<i>infra</i> TR	
FL. CL. IVLIANVS. P. F. AVG	VOT. X. MVLT. XX. <i>infra</i>	
	ANT.	68 $\frac{1}{2}$
D. N. IOVIANVS. P. F. PERP.	SECVRITAS. REIPVB-	
AVG.	LICAE.	68
	VOT. V. MVLT. X. <i>in-</i>	
	<i>fra</i> COS. P	
D. N. VALENS. P. F. AVG	RESTITVTOR. REIP.	
	<i>infra</i> ANTO	68 $\frac{1}{4}$
D. N. VALENTINIANVS. P. F.	RESTITVTOR. REI-	
AVG	PUBLICAE	69 $\frac{1}{4}$
		69
<i>A second</i>	VICTORIA. AVGG. <i>in-</i>	
D. N. GRATIANVS. P. F. AVG	<i>fra</i> TROES.	69
		68 $\frac{1}{4}$
<i>A second</i>	VICTORIA. AVGG. <i>in-</i>	
D. N. THEODOSIVS P. F. AVG	<i>fra</i> CON	68
		69 $\frac{1}{4}$
<i>A second</i>	NOVA. SPES. REIPVB-	
D. N. ARCADIVS. P. F. AVG	LICAE.	67 $\frac{1}{2}$
	<i>intra corollam</i> XX. XXX	
	<i>infra</i> CONOB	68
<i>A second</i>	VICTORIA. AVGGG.	69 $\frac{1}{4}$
D. N. HONORIVS. P. F. AVG	<i>statua, cui inscript. R. V</i>	
	<i>infra</i> CONOB	69 $\frac{3}{4}$
<i>A third</i>	VICTORIA. AVGGG.	
D. N. HONORIVS. P. F.	N. D. <i>infra</i> CONOB	68 $\frac{1}{4}$
AVG		
D. N. THEODOSIVS. P. F. AVG	IMP. XXXXII. COS. XVII	
	P. F. <i>infra</i> CONOB	69 $\frac{1}{2}$
D. N. PLA. VALENTINIANVS	VICTORIA. AVGGG.	
		D. N.

D.N. VALENTINIANVS. AVG	<i>infra</i> CONOB. —	68
D. N. VALENTINIANVS. P. F. AVG	VICTORIA. AVGGG	69 $\frac{1}{4}$
	<i>infra</i> CONOB. —	68
D. N. IVL. NEPOS. P. F. AVG.	VICTORIA. AVGG.	68
D.N. ANASTASIUS. P. F. AVG	<i>infra</i> TROES. —	69 $\frac{1}{4}$
D.N. IVSTINIANVS. P. F. AVG	VICTORIA. AVGGG.	68 $\frac{1}{2}$
D.N. FOCAS. PERP. AVG	A. <i>infra</i> CONOB. —	69
D.N. FOCAS. PERP. AVG	VICTORIA. AVGG.	68
	<i>infra</i> CONOB. —	69 $\frac{1}{4}$
...HERACLIVS.	VICTORIA. AVGG. in-	69 $\frac{1}{2}$
a second	<i>infra</i> CONOB. —	69 $\frac{1}{4}$

And thus much of the *aurei* under the former, and later Emperours, as they serve to illustrate, and prove the weight of the *denarii Cesarei*, which is our next, and principall inquiry.

The *denarii* under the *Cesars* were almost as various, and unconstant, as the *aurei*, sometimes more, sometimes lesse; and if they had not been so, they could not have kept that proportion to the *aurei* of the former Emperours, which we assigned. From *Augustus*' time to *Vespasian*, as I finde by examining many of them, they continually almost decreased, till from being the seventh part of the Roman ounce, they came now to be the eighth part: and therefore ninety sixe were coined out of the Roman *libra*, whereas before under the Consuls eighty four. From *Vespasian* to *Alex: Severus*, as far as I have observed,

ved, the silver continued at a kinde of stay in respect of weight, excepting onely such coins, as upon some extraordinary occasion, both then, and in the first Emperours time, were stamped, either in honour of the Prince, or of the Emperesse, and *Augusta familia*, or else in memory of some eminent action. These last, most usually were equall to the *denarii Consulares*, and many of them had these characters E X. S. C or else S. P. Q. R Under *Severus*, and *Gordianus*, the *denarii* began to recover their primitive weight, and came to be equall to the *denarii Consulares*, the half of which also were exactly the *Quinarii*: and so continued during the succeeding Emperours till *Iustinian*, with little diminution, but most commonly with a notable abasement, and mixture of allay. After *Iustinian*, there happened such a deluge of barbarous Nations, which overflowed the greatest part of *Europe*, that not only the coins, but even the liberall arts, and sciences, began with the majesty of the Empire to decline from their first lustre, and perfection.

Wherefore I shall not speak of the *μυλιαρίσιον*, or *μυλιαρίσιον*, a sort of silver coin in use, before, and after *Iustinian*, which some collect out of *Cedrenus* to have been the eighth part of the ounce, and therefore equall to the *denarius*, in the lowest valuation; though \* *Snidas* renders *μυλιαρίσιον* τὸ τε νόμισμα τοῦ δάχατον, and the *Scholastes Basilic. Eclog. 23. ἀποδίδωται*, and to contain twenty four *φόλλαις*. But I shall not positively determine, either the weight of this, or of the *πρόπον*, or *siligna* in silver, both coined when the Emperiall seat was translated

*Cedrenus in histor. compend.*

\* *Snidas in vocab. μυλιαρίσιον.*

to *Byzantium*, unlesse I had examined some of the fairest of them. And for the same reason I shall not define the Hebrew *denarius*, mentioned by *Eliás* in *Thisbite*, in the word דִּנָּר, & by \* *Moses Gerundensis* upon *Exodus*, and by the \* *Chaldy Paraphrase*, 2 Reg. 5. 5. which I imagine to have been no other then the Romane *denarius*, used by the Jews: neither shall I determine the Arabian دينار *dinar*, and درهم *derham*: the former of which the Rabbins call דִּנָּר עֲרָבִי, used by *Rhasis*, *Avicen*, *Mesue*, and by severall other Arabians, both Physicians, and Historians. All that can certainly be concluded is this, that by the دينار *dinar*, when wee speak of a coin, is meant sometime the *denarius*, and sometime the *aureus*: but when we speak of a weight, alwaies the *aureus* is understood: as by the درهم *derham*, the *sexxum*, or silver dram. But surely the quality of the thing is different from the name: the silver drachme of the Arabians, as it is generally now used in the Mahometane dominions in the East, consisting of XLVII. grains English, (as I have found by weighing many of them) which is much lesse then either the *Drachma Attica*, or the *denarius Consulatus*: & somewhat lesse then the *Denarius Casareus*. And yet it is not improbable; but that this may have continued with the, without any diminution, for sixe, or seven hundred years to our times: as well as the Romane pound, and ounce, have continued intire sixteen hundred years, and bet-

better. But to omit any farther prosecution of the درهم & دينار of the Arabians, which may hereafter more fully be discussed, when we shall handle their measures, and weights, and to goe on with our discourse of the Romane *denarius*. After the breaking in of so many barbarous Nations, as of a torrent, into the Romane Empire, the *denarius* began generally to be disused, every one almost of these, as an argument of their Sovereignty, and conquests, making new coins of their own: or else such as continued the former, either by allais so abased the finenesse, and valuation of the coins, or by severall diminutions so impaired the weight, that the *denarius* totally fell, and at last almost vanished into nothing. Neither will this seem strange, if we shall consider that the like alteration, in respect of weight, hath happened, by the revolution of a lesse time, in our own coins. I shall instance in our *denarius*, or penny, which in *Ethelreds* time, that is, a litle more then 150. years since, was the twentieth part of the Troy, or silver ounce: as <sup>b</sup> M. *Lambard* in his Saxon Glossary observes, and as by experience I have found (and the same proportion was anciently observed by the <sup>c</sup> French in their *denier*). This proportion continued successively to *Edw*: the first, in whose time we find the weight of the *denarius* by \*Statute to be thus defined. *Per ordinationes totius regni Anglia denarius Anglia, qui vocatur Sterlingus, rotundus, sine tonsura, ponderabit 32 grana frumenti in medio spica, & 20 denarii faciunt unciam, & 12 uncia faciunt libram.* Under <sup>d</sup> *Edward* the third it came first

<sup>b</sup> *Lambardi  
Glossarium  
Cantabrig:  
1644.*

<sup>c</sup> *In appendice  
libri de limit.  
agrorum: Iuxta  
Gallos vigesima  
pars unciae  
denarius est, &  
12 denarii solidum  
reddunt.*  
\* Stat. 31. E.  
dov. 1.

<sup>d</sup> Stat. 9. Ed. 3.



first to be diminished to the twenty sixth part of the Troy ounce : and under <sup>c</sup> Henry the sixth <sup>a</sup> Stat. 2. Hen. 6. it fell to be the two and thirtieth. In <sup>f</sup> Edward <sup>f</sup> Stat. 5. Ed. 4. the fourths time it came to be the fortieth. Under <sup>g</sup> Henry the eighth at first it was the fortieth <sup>g</sup> Stat. 36 H. 8. then the forty fifth. Afterward sixty pence were coined out of the ounce in the second year of <sup>h</sup> Queen Elizabeth ; and during her reign <sup>h</sup> Stat. 2. El. sixty two : which proportion is observed in these times. So that it is evident that *Ethelreds'* penny was bigger then three of ours. And after times may see this of ours, as well as the Roman *Denarius*, to be quite diminished , and brought to nothing. For if either our own exigencies, or the exigencies of forain States, with whom we have commerce, cause us, or them (as occasions will never be wanting) to alter the proportions of the gold , and silver coins, either in respect of weight, or in respect of purity , or lastly, in respect of the valuation, the gold bears to silver ; by all , or some of these causes, there will inevitably happen such a diminution of the penny (and proportionably of our other coins) that at length it will not be worth the coining. But I leave this speculation to such , whom it doth more neerly concern. And certainly it is a consideration not of the least importance ; money being as the sinews, and strength of a State, so the life, and soul of commerce : and if those advantages, which one Country may make upon another, in the mystery of exchanges, and valuation of coins, be not thoroughly discovered, and prevented , by such as sit at the helm of the State , it may fare with them after much commerce,

\* In the same manner the *solidus*, or *aureus*, as it lost its valuation, so suffered an alteration in the Greek name. For instead of *χρυσός* we finde the Glosses to render it *χρυσίδες*. *Glossæ.* χρυσίδες *solidus*: and in the same Glosses we read *ἀννέειον* interpreted *Biniones*, and *ἀννέειον* *sestertium*, and *ἀννέειον* *λευκόν* *asprum*.

*Meurſii Gloſſarium Græco-Barbar: in voce* *ἀννέειον*.

\* *Scalig. de re numm.*

merce, as with some bodies after much food, that instead of growing full, and fat, they may pine away, & fall into an irrecoverable consumption. But I return to the Romane *denarius*, which vve have brought so low, that there is nothing now left of it, but only the name: and that also suffered an \* alteration. For the later Greeks instead of the *ἀννέειον* called it the *ἀννέειον*: and both Greeks, and Latines, and sometimes the Arabians, took it not in the same sense, as it passed for in the first institution, that is, for a silver coin, worth in valuation ten, or sixteen *asses*, but for any sort of coin whatsoever. And therefore *Meurſius*' observation, in his *Glossarium Græco-Barbarum*, is worth our consideration. *Postea ἀννέειον dixerunt avo corruptiore, & generaliter pro quavis pecuniâ. Sicut Itali denaro. Galli Denier, Hispani Dinero. Anonymus de bello sacro.*

Δωδεκα ἔχετε πολλά, ὥστε τῷ ταβερνάρῃ,  
ἐπάρχετε πολὺν κρασί, καὶ πίνετε μετ' αὐτοῦ.

Whence the learned \* *Jos. Scaliger* rightly observes, that, *ultimis temporibus denarii pro exigua stipe usurpati sunt, ut hodie in Gallia. Imperator Aurelianus: Philippeos minuculos quinquagenos, aris denarios centum. Eos Papiſcus in Bonoso sestertius aris vocat. Macrobius de nummo ratito loquens, qui erat arens: Ita fuisse lignatum hodieque intelligitur in alex lusu, cum pueri denarios in sublime jactantes, capita, aut navia lusu teste vetustatis exclamant. In Evangelio secundum Marcum 12. λέγει δὺο ὁ θεὸς κοσμήτους. Hilarius duos denarios vidue inopis Deo acceptiores. Luc.*

10. ἐμβαλὼν δύο ἀνδρες, *Ambrosius*, duo erant: *Vetustissimus est igitur denarii usus ἀπὸ τῆς χαλκισμῆς, vel stipe.* Thus far *Scaliger*.

Such an uncertainty being then, as we have mentioned, both of the *aurei*, and *denarii*, under the first *Cæsars*, in whose times the purest coins, and the best wits most flourished, and such an abasement, and impureness of the silver under the later Emperours, no reasonable man can imagine, that either the ancient Grammarians, Poets, Oratours, Historians, or especially Physicians, whom it did most concern to be precise, and most of which lived under the former Emperours, did ever allude to the weight of the *denarius Cæsareus*, but rather to the *Consularis*. And to this onely, and to no other, did the Attick drachme mentioned by *Dioscorides*, *Cleopatra*, *Galen*, *Julius Pollux*, *Oribasius*, and the rest of the Greek Authors correspond. And thus have we finished our discourse concerning the *denarius*, in the notion, and acception of the Ancients, both Greeks, and Latines,

Our next labour should be to compare it with the standards for weights of divers Nations, used in these times. For which I had recourse to the publick *Zygoſtata*, and *Ponderatores*, in my travels abroad: and for my observations I must refer the Reader to this ensuing Table.

\* These weights (excepting the rotulo of *Damascus*) were diligently compared with the Originals, and Standards: in like manner as I examined the measures above described. In both which if any shall finde some litle difference, from some Originals, as five, or six grains in the English pound, & it may be one, or two parts of a thousand in the English foot, different from the Standards in the Exchequer, or the Tower, or at Winchester, or some other place, it is not much to be wondred. For I have found as great differences in collating the English Standards themselves: and have heard *Gasparo Berti* (one of the exactest men in this kind that I have known) to complain of the same diversity at *Rome*. And though it bee a shame that in any well governed Kingdome, or Common-wealth, the Standards, which are the rules of commutative justice, should

*A Table of the gold, and silver \* weights of severall Nations, taken from their Standards, and compared with the Denarius.*

	Eng: grains.
<b>S</b> uch parts, or grains, of the English Standard for gold, and silver (or of the Troy weight) as the <i>denarius Consularis</i> containeth 62, according to the weight of the best coins, or according to the weight of the <i>Congius</i> of <i>Vespasian</i> —	62 $\frac{1}{2}$
The ancient, and modern Romane ounce containeth—	438
The ancient, and modern Romane pound, consisting of twelve ounces, containeth—	5256
The Troy pound, or English Standard of gold & silver; consisting of twelve ounces, containeth—	5760
The Troy, or English ounce, (to which five shillings two pence of our mony in these times are equal) containeth—	480
The Paris pound, or Standard for gold and silver, of xvi ounces—	7560
The Paris ounce—	472 $\frac{1}{2}$
The Spanish pound, or Standard for gold and silver, of sixteen ounces, taken by me at <i>Gibraltar</i> —	7090
Another weighed by me at <i>Gibraltar</i> —	7085
	The

<i>The Spanish pound in Villalpandus, is</i> (I know not by what error) but--	7035
The Spanish ounce at Gibraltar (the pound consisting of 7090. grai English)	443 $\frac{1}{4}$
The Venetian pound, or Standard for gold and silver, of XII. oun.--	5528
The Venetian ounce	460 $\frac{1}{2}$
The Neapolitane pound, or Stan- dard for gold & silver, of twelve ounces	4950
The Neapolitane ounce	412 $\frac{1}{2}$
The pound, or Standard for gold and silver, of twelve ounces, at Florence, Pisa, and Ligorn	5286
The ounce at Florence, Pisa, and Ligorn	440 $\frac{1}{2}$
The pound, or standard, at Siena, for gold & silver of twelve oun.	5178
The ounce at Siena	431 $\frac{1}{2}$
The ounce at Genoa, for gold and silver	405 $\frac{1}{2}$
The Turkish Okeh, or Oke, at Con- stantinople, consisting of four hundred silver drams	19128
The silver dram generally used in the great Turks' dominions; as also in Persia, and in the Moguls' Countries, if I be not misinformed	47 $\frac{1}{2}$
The Turkish sultani, or Egyptian sherif, being a gold coin, with w <sup>ch</sup> the Barbary & Venetian <i>chequeen</i> , and Norimberg ducat, within a grain more, or lesse, agree	53 $\frac{1}{2}$

The

be unequal, & there-  
fore unjust; yet unless  
more art, and circum-  
spection be used, then  
hitherto hath been put  
in practise, it is im-  
possible but such ine-  
qualities will creep in.

But this observati-  
on of mine by some  
may be thought too  
nice, and curious: That  
which follows, I am  
certain, is as necessary,  
as the preservation of  
the life of many a  
man. And that is, that  
some Physicians erro-  
neously imagine the  
*granum auri* to be a-  
like in all Nations.  
And therefore *Ferne-  
lius*, a very able man  
(who, I think, was the  
first Authour of that  
opinion) writes thus.  
(*Fern l. 4. c. 6. Method.  
Medendi*) *Granum, cui  
tanquam basi reliqua  
innituntur pondera,  
ratum constansque esse  
debet; neque id granum  
esse bordei, neque triti-  
ci, neque cicercis, neque  
frugis ullius, aut legu-  
minis, quod nullum  
par sit ubique gentium  
pondus. At vero num-  
marium minutum, quod  
aurisabri granum ap-  
pellant, & Latine mo-  
mentum dici potest,*

*omnibus mundi nationibus unum idemque officium stabile, quod auri facta fames, & opum furiosa libido, inviolatè & incorruptè servat, idque signis & exemplaribus undique identidem collatis.* Indeed it was an usefull fancy of his to think of some common mea-

sure, in which all Nations might concur: though it is more to be wished for, the  
ever to be expected: But that asseverati<sup>o</sup>n of his, *involutè, & incorruptè servat, idque signis & exemplaribus undique identidem collatis*, from a man of such rare abilities, I cannot but extremely wonder at. For if we shall goe no farther to confute his assertion, then to compare our *grana auri* with those of Paris, which *Pernelius* used, we shall find ours much bigger: *XXIX.* English grains almost equalling *XXXVI.* of Paris. Or if we shall compare the *Spanish grana auri*, with his, we shall finde those much lesse: *XXXVI.* Spanish grains weighing but *XXVII.* of his at Paris. The like could I demonstrate in those of other Countries. By which dangerous, and notable error, for want either of due care, or an exact balance, we may conceive that whatsoever also is delivered by the Ancients, in the like nature, is not presently without due examination to be credited.

The *Ratel*, or *Rotulo*, for gold and silver of 144. drams, at Cairo—6886;

The *Ratel*, or *Rotulo*, for silk of 720 drams, at Damascus (with which I suppose they there formerly weighed their gold and silver; because most Countries use the same weights for silks, gold, and silver)———34430;

In this Table I judg'd it much fitter to compare the *denarius*, with the Standards for gold, and silver of severall Nations, then with their gold and silver coins, now current. Because the pounds, and ounces of the Standard, continue alway the same; whereas the gold, and silver coins, being cut in severall proportions, according to the exigencies of the State, admit of severall alterations, and diminutions.

## The CONCLUSION.

**I**T was my intention from the *Pes Rom.* and *denarius*, together with the *Congius of Vespasian*, to have deduced the other weights, and measures, used by the Romanes; and from those of the Romanes, by such testimonies, as are upon record in the writings of the Ancients, to have inferred those of the *Hebrews, Babylonians, Egyptians, Grecians, and of other Nations*. A work I confesse intricate, and full of difficulties: wherein I could expect neither to give my self, nor others satisfaction, without first laying some sure, and solid principles for the *basis*, and foundation. Therefore that occasioned me to insist the more largely in the prosecution of the *pes Rom.* and *denarius*, and to examine all the waies, I could possibly imagine, for the evident proof, and confirmation of them. What in this kind I have done, and with how much truth, and diligence, I leave to the impartial test of after times, the rest at more leisure may be perfected. Yet these following observations, as a *coronis* to the whole work, I thought would not be unacceptable, if by way of anticipation I communicated them to the world: and those are how the Originals, and Standards, of weights, and measures, notwithstanding the revolutions, and vicissitudes of Empires, may be perpetuated to posterity. Amongst

mongst severall waies, which I have thought of, I know none more certain, and unquestionable, then to compare them with some remarkable, and lasting monuments, in remote Countries, that have stood unimpaired for many hundred years, and are like to continue as many more. In which kinde I made choice of *the first, and most easterly of the three great Pyramids in Egypt; of the basis of that admirable Corinthian pillar, erected (as I suppose) by one of the Ptolemies, a quarter of a mile distant to the South from Alexandria, being one vast, and entire marble stone: Of the rock at Terracina, or Anxur, where it adjoins to the via Appia, and almost touches the Tyrrhene sea: Of the gate, or entrance into the Pantheon, or Temple of Agrippa, dedicated by him to all the gods, and by the Christians to all Saints. Of the Porta sancta, in that new, and exquisite structure of Saint Peters Church in Rome.* If the like had been attempted by some of the ancient Mathematicians, our times would have been freed from much uncertainty, in discovering the weights, and measures of the Greeks, and Latines.

The first, and most Easterly of the three great Pyramids in Ægypt, hath on the North side a square descent, when you are entred a litle past the mouth of it, there is a joint, or line, made by the meeting of two smooth, and polished stones over your head, which are paral-

lel



1el to those under your feet, the breadth at that joint, or line, is 3 feet and  $\frac{1}{10}$  of the English foot.

Within the Pyramid, and about the midst of it, there is a fair room, or chamber, the top of which is flat, and covered with 9 massy stones: in it, there stands a hollow tombe of one entire marble stone: the length of the South side of this room at the joint, or line, where the first, and second rowes of stone meet, is 34 feet  $\frac{1}{10}$ .

The breadth of the west side of the same room at the joint, or line, where the first, and second row of stones meet, is 17 feet  $\frac{1}{10}$ .

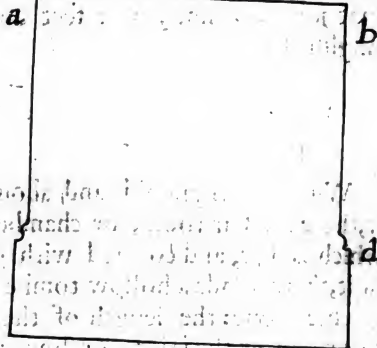
The hollow, or inner part, of the marble tomb near the top, on the west side of it, is in length 6 feet  $\frac{1}{10}$ .

The hollow, or inner part, of the marble tomb, near the top of it, on the north side, is in breadth 3 feet  $\frac{1}{10}$ .

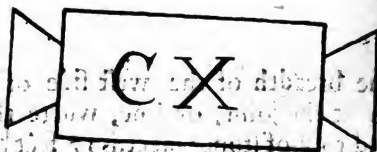
The

The basis of the vast Co-  
rinthian pillar, about a quar-  
ter of a mile from *Alexan-  
dria* to the South, on the  
West side of the pillar at *a b*,  
is in breadth 12 feet  $\frac{11}{12}$

at *c d* it is 14 feet  $\frac{11}{12}$



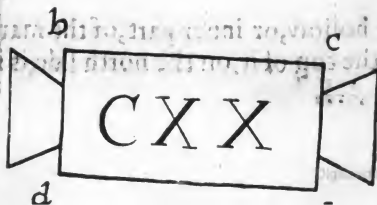
The rock at *Tarracina*, or  
*Anxur*, neer the *via Appia*,  
close by the *Tyrrhene* sea,  
hath these figures, besides  
severall others in the same  
perpendicular, very deeply  
engraven.



The uppermost line *b c*  
over the figures *CXX*, in  
the innermost, and deepest  
part of the engraving, is in  
length 4 English feet, and

$\frac{11}{12}$

The lowermost line *a d*,  
in the innermost, and deep-  
est part of the engraving, is  
length 4 feet  $\frac{11}{12}$



The

*d*

The stately gate, or entrance, into the Pantheon, or Temple built by *Agrippa* in *Rome*, the jambes, and top, and bottoome of it, being all of one intire marble stone, is in breadth between the jambes, or sides, some three inches above the bottoome, and some nine inches within, nineteen feet  $\frac{10}{11}$ .

The *Porta sancta*, on the right hand of the frontispice of Saint *Peters* Church in *Rome*, is in breadth on the pavement, or threshold, between the jambes, or sides of the entrance, eleven feet  $\frac{10}{11}$ .

The great gate, or entrance, which is the middlemost of the five in the frontispice of Saint *Peters* Church in *Rome*, the doors of which are covered with leaves of brasfe, with very fair and exquisite figures, is in breadth on the pavement, or threshold, between the jambes, or sides of it, eleven feet  $\frac{10}{11}$ .

The measures being fixed, we may likewise fixe the weights in this manner; by making a vessell of a cubicall figure, answerable to the proportion of any one of these feet, or palms, or braces, which are described in the Table at the end of the first Treatise. This cubicall vessell being filled with cleer fountain water, we are to weigh it with an exact balance, and to expresse, the weight of it by some one of those weights, which we have placed in a Table at the end of the second Treatise. The side of this cube being known, and the weight of it in water defined, the rest of the weights in the second Table, by way of consequence by those proportions, which we have assigned, may be discovered.

red. Thus for example : the Romane foot described by *Villalpandus* is nine hundred eighty six parts, such as the English foot contains a thousand : this being cubed (saith he) weighs of fountain water eighty Romane pounds. If therefore there be given nine hundred eighty six parts of a thousand of the English foot, the cube of this will give us eighty Romane pounds in fountain water : and consequently the other weights will be discovered by those proportions, we have assigned to them, in respect of the Romane pound. Again, eighty Romane pounds of water being given, if we reduce this into a cubical body, the side of it will give the Romane foot described by *Villalpandus* : and consequently the other measures may be deduced, by those proportions we have given them in a peculiar Table. Whereby it appears, that as *by measures* weights may be preserved, so on the contrary *by weights* measures may be restored.

Some



Some directions to be observed in  
*comparing the valuations of*  
*coins.*

**I**N comparing the valuations, either of ancient coins with modern, or of modern one with another, we are to consider : first, the *intrinseck* of them, and then the *extrinseck*. The *intrinseck* is either the *fineness* of the coin in respect of metall, or the *gravity* in respect of weight. The *extrinseck* I term first, the *character* imprinted on the coin: and secondly, the *valuation* enjoined by the Prince, or State: by which character, and valuation, what *originally*, and *materially*, was but common metall, or plate, comes now *legally*, and *formally*, to be current money. With these limitations, if we shall compare ancient coins with modern, and modern one with another, it will be no difficult matter to proportion out their severall respective valuations; and withall to reconcile the seeming repugnancies, either of ancient coins, now found, differing from the traditions of ancient Authors: or the traditions of ancient Authors differing amongst themselves.

I shall first give an instance of modern coins compared with modern, in our English money compared with that of *Spain*, as being most familiar

miliar to us : the application of which will by analogy serve for all other distinct States, and times, using distinct coins.

In comparing therefore *English mony with Spanish mony in England*, or *Spanish mony with English in Spain*, we are thus to proceed: First, we are to examine whither they be of a like finesse, for the *intrinseck* ; if they be, then an ounce of *English mony*, and an ounce of *Spanish* ( supposing the weight of the ounce to be alike ) will bee of like value in any other Country out of *England*, and *Spain* ; where neither are currant, but onely considered as so much metal, or plate. Secondly, we are to consider the *extrinseck*, that is, the form, and stamp of the coin, with the valuation of it by the injunction of the Prince of either State; and here that which before was *equall*, comes now to be *unequall*. For an ounce of *English mony* in *England* comes to be more worth, then an ounce of *Spanish mony* in *England*: because this wants the character, stamp, and valuation of our Princes, whereby it is currant: and for the same reason will an ounce of *English mony* be lesse in valuation, then an ounce of *Spanish mony* in *Spain*, supposing (as I said) the ounce in both Countries to be exactly one and the same.

The same analogy will be, if we compare ancient coins, as those of the *Hebrews*, *Greeks*, and *Romans*, with our *modern coins*. We are first, to consider the *intrinseck* of them, whither they be of a like weight, and finesse for the metall, with ours: and this is the *naturall*, or

*physical*

*physicall consideration*. From whence we may conclude, that if, for example, so many *Attick tetradrachmes* doe equall in pureness, and weight, so many of our *English* shillings, newly brought from the mint, or so many of our *Troy*, or *silver ounces*, taken from the Standard, then are they to be balanced with these in the acception of them as plate; and a silversmith, abstracting from the *extrinseck*, that were to melt them both, would give a like value for them both. But if we secondly, look upon them with the image, and character of the State, and in the notion of mony, which is *the politick consideration*, then that which before in the *trutina*, and scale, was equall, in the *foro*, and in commerce, comes to be unequal: and an ounce of *English* mony shall passe for more, then an ounce in *Attick tetradrachmes*, with reference to the expenses of the mint, and to the civill valuation, depending upon a mandate, or law, enacted by the Prince.

In like manner will it be, if we compare ancient coins with ancient, made in different States, as it is in comparing ancient with modern.

Upon these grounds of reason it will follow, that whereas the *Romane* Authours make the *denarius Consularis* to be equall to the *drachma Attica*, and the *Greeks* equall the *drachma Attica* to the *denarius Consularis*, that both say true; and yet both of them, if we speak strictly, and exactly, may be deceived. For the *denarius Consularis* examined by the balance, which is the best judge of the *intrinseck*. (I speak of the

*intrinseck* in respect of weight, and not of the *intrinseck* in respect of finenesse, that being best discovered by the *scale*, and this by the *test*: which last for the more cleernesse of my discourse, I suppose in all these coins to be alike). I say the *Denarius Consularis* is found by me, contrary to the opinion of all modern vvriters, to be lighter, then the *drachma Attica*: and therefore, to speak strictly, and precisely, cannot be equall to it in the *intrinseck*. But again, if we look upon the *extrinseck* of the *drachma Attica*, and *denarius Consularis*, that having the stamp of *Athens*, and this of *Rome*, here reason must be our balance, and not the *trutina*. For the Athenian coin being a forainer, and not currant in *Italy*, in the way of exchange, and commerce, will loose of its primitive valuation it had at *Athens*, and for want of the *extrinseck* of the *Romane* stamp, necessarily rebate in the *intrinseck*. And therefore both Greeks, and Romanes, vvriting in *Italy*, might truly say, that the *denarius Consularis*, and *drachma Attica*, were equall, that is, speaking in *civill commerce*, and *popular estimation*: although they were unequall in the *intrinseck*, and *naturall valuation*.

But if we shall change the scene, and carry the *denarius Consularis* to *Athens*, the case will quite be altered. For the *denarius* being a stranger, and the *drachma Attica* a denizon, that cannot have the same priviledges with this. And therefore the *extrinseck* of the *denarius* being there of no use, and the *intrinseck* in respect of weight falling short of the *drachma*, it must necessarily



cessarily be much lesse in valuation at *Athens*, then the *drachma*: and I think no advised *Athenian*, writing in *Attica*, would make them equall, I am certain no *nummularius* would.

The same may be said of the *Hebrew shekel*, and *Attick tetradrachme*, and of all other coins, of distinct States, mentioned in classicall Authors. Thus *Philo*, and *Iosephus*, in *Judaea*, both truly equall the *shekel* to the *Attick tetradrachme*, that is, in way of commerce; though the *shekel* be unequall, and lesse then the *tetradrachme* (as I have found by examining many of them) in a just notion of weight. The reason is evident by vvhat hath been expressed before. For in *Judaea* the *extrinseck* makes amends, for what the *shekel* wants in the *intrinseck*; and on the contrary, what the *tetradrachme* exceeds in the *intrinseck*, is diminished for want of the *extrinseck*, till at length in a popular estimation they come to be equall. But the quite contrary would happen, in the transportation of shekels from *Jerusalem* to *Athens*. Here the *shekel* would necessarily fall from its primitive valuation, and the *tetradrachme*, being considered now no longer as a forainer, would recover what it lost in *Judaea*, and consequently rise above the *Hebrew shekel*: as having a double advantage in the *extrinseck*, from the *State*, and in the *intrinseck* from its weight.

But what need we to goe so far for examples, when as we instanced before, wee have them neerer home? The *Spanish* quarters of the dollar, or *double rials*, passe ordinarily in our

Sea towns but for *shillings*, (whereas they are worth in the *intrinseck* thirteen pence farthing) and our *shillings* passe in *Spain* scarce for a *riall* and an half. For theirs wanting in *England* our *extrinseck*, and ours in *Spain* wanting their *extrinseck*, must respectively rise, and fall in their valuation.

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